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ADDRESS.

OUR PRESENT KNOWLEDGE OF TUMORS AND CANCERS.

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It is natural in selecting a subject for an address on an occasion like this to choose those achievements in surgery which have made the glory of this generation. The rehearsal of triumphs is a most pleasant theme for both orator and hearers, and I have been tempted to indulge in that mutual congratulation which is not out of place when a great profession is called together to debate matters of common interest. It has been with a good deal of self-denial and some misgivings that I have turned from these pleasanter matters to ask you to join me in an attempt to review the darkest and most difficult field of surgery, in order, if possible, to gain some clear ideas as to the present state of our knowledge of the pathology of tumors and cancers. In this department of medicine, we may indeed claim some advances in exact knowledge made during the last three decades, but we can not pretend to any such triumphs as have in the same period revolutionized the methods of operative surgery.

If we compare the ideas that prevailed relative to these diseases, thirty years ago, with those which the profession hold to-day, we find a change which is marked rather by a clearer view of the nature of the problem than by any actual gain in its solution. Before Virchow, the subject of tumors and cancers was wrapped in the greatest confusion. It was not only that pathologists had not learned to distinguish accurately between neoplasms and the many false tumors which stimulate them, a kind of diagnosis indeed which is still very defective, but chiefly because at that time there were no clear conceptions of those cellular relations which to-day are regarded as fundamental in all pathology. Tumors were divided and classified in that era according to their clinical histories. They were divided into the innocent, which were looked upon as purely local, and the malignant, which were regarded as due to dyscrasia, the seat of which was in the blood. The latter were looked upon by many as parasitic, and surgeons who dabbled with the microscope were sure that they recognized peculiar cells which differed from all others, and indicated the cancerous nature of the disorder.

Under the influence of the new cellular pathology the faith in so-called dyscrasia was abandoned and supplanted by a new doctrine, which taught that tumors and cancers resulted ever and always from aberrations in cellular nutrition, development and growth. For three decades pathologists have sought the explanation of the mystery of morbid growth in histologic studies. It may be truly said that during this time the energies of the profession, as far as tumors are concerned, have been confined almost solely to this channel. Clinical observation and chemic analysis had failed alike in throwing light upon this most vexed problem, and the profession turned with enthusiastic hope to the study of the morphology of the cellular elements of the body, as a new field in which they could work without despair. There can be no doubt of the gain which has accrued from these labors; clearer ideas have been acquired of cellular relations and even incidentally, of cellular pathology. Systems of classification have been founded for the study of tumors which if not altogether satisfactory have, nevertheless, some warrant in science. The important rôle played by the embryonic processes of development in the causation of certain morbid growths has been established, and the educated physician of to-day could not possibly fall into some of the gross errors which were common thirty years ago, but after all, our progress, great as it has been in some respects, has been thus far disappointing, that it has not brought us to our goal. We have been like those early wanderers in Florida, who sought for the magic fountains; they found innumerable tribes of Indians, they crossed many great rivers, they learned more of the new world, than they had ever dreamed of, but the magic waters continually eluded them. So we have learned much of cell life and have wondered more and more at the living tissue, but know hardly more of the causes which underlie the growth of a neoplasm than the surgeon who lived a hundred years ago. It is interesting as well as wonderful to note how after thirty years of cellular study, many in the profession are reverting to the old theory of parasitism, by which since the world began, men have tried to account for malignant diseases. In fact, notwithstanding the ingenious systems of classification now in vogue, it is to-day as difficult to define exactly the word tumor, as it was when Virchow wrote his great book. All sorts of enlargements at that time were huddled together in the same category. Hematoceles, dropsies, inflammations, aneurysms and varicoceles, retention cysts, the distended bladder and even the pregnant uterus were all spoken of in the same chapter with the neoplasm, as tumors. Now, while to-day, more judgment is used in this respect, we nevertheless find even in our newest text-books the true tumors discussed in connection with purely accidental swellings. It does not help us much, to recognize the fact that the difficulties in classification are inherent and insurmountable with our present knowledge of pathologic processes.

In the term, cancers and tumors, we group together certain diseases in common that distinguish them from all other maladies, but when we come to

ask ourselves what these common traits are, and try to define them, we become at once perplexed. The reason of this is that, in studying the subject closely, we find a multitude of growths which occupy that doubtful zone which lies between the neoplasm on the one hand, and the accidental and inflammatory enlargements on the other. We find swellings which seem in part accidental, and yet which belong clinically to the new growths. I became first fully aware of this when I tried for purposes of classification to divide all morbid enlargements into two classes: 1, the neoplasms proper, or true tumors; and 2, those swellings which imitate them, but are purely accidental or inflammatory, the false tumors. I had wished in this way to simplify the subject, but when I began to classify tumors and to determine which properly belonged to the neoplasms and which to the false tumors, I became involved in difficulties. There are, in the first place, many growths of inflammatory origin which eventually develop into undoubted neoplasms, and it is impossible to draw a line and say, Now, this is an inflammation and this is a tumor. A wound will heal badly and there will be left a large, thick, ungainly scar which in its structure resembles closely the keloid growths which spring from scars and are regarded as true tumors. Are we to look upon every permanent thickening of a scar as a neoplasm?

The retention cysts are usually regarded as accidental formations, due either to closure of a duct or to a thickening of secretion. They sometimes result directly from injury, and yet there are retention cysts or cysts which can not be distinguished from them, which occcur under circumstances which make us conclude that they are true neoplasms. It is, however, especially with those tumors which spring from irregularities in embryonic development that we are puzzled in classification. There are cysts under the tongue which are due to an imperfect closure of the thyro-glossal duct. The duct becomes obliterated at both ends, but leaves a cavity in the middle lined with secreting cells, and as a result there is a cyst. Here, then, is no new growth whatever, only a defect in coalescence, and if the defect is still greater and the duct remains open at the outer end, there is no tumor at all, but only a fistula.

A dermoid cyst is caused by the infolding of the epiblast, which become displaced and shut in among the connective tissues. The cells thus sequestered continue to develop and there results an epidermal cyst, universally reckoned among the neoplasms, but a post anal dimple is formed in precisely the same way, except that the burial is not quite so complete and yet no one thinks of calling such a recess a tumor.

If we are to class those growths which arise from superfluous and aberrant embryonic germs with the neoplasms, how can we leave out of the category those extra fingers and toes which often hang from the side of the hand or foot by a mere thread of tissue. We may say of an extra toe, when it is in its proper place on the foot and endowed with tendons, nerves and all of the apparatus for motion, that although unusual it is nevertheless not abnormal. But the extra toe that grows from the skin on the side of the foot is, in its origin and growth, just as much of a tumor as the sequestered piece of epidermis that we call a dermoid and yet no one thinks of calling it a neoplasm.

It is practically impossible to sharply define processes which are in their nature transitional, and the utmost which can be done as yet in the way of classification is to establish certain broad distinctions which may act as landmarks by which we mark the passage of nutritive operations from the normal to those essentially abnormal conditions such as we find most pronounced in the typical neoplasm. It is again, nevertheless, to know that the transition is gradual and that the healthy structure is not sharply defined from that which is morbid.

There is no theory which has yet been framed which satisfactorily accounts for the phenomena exhibited by morbid growths. Virchow's doctrine of the proliferation of the cellular elements under prolonged irritations is too vague to be of practical value. What we need to know and what we have not been able to find out, is the nature of the conditions under which irritation will produce that effect, for we know very well that, as a rule, in healthy individuals, prolonged irritations cause chronic inflammation but not tumors. It may be that there are specific irritations which generate neoplasms or that common irritations acting upon peculiar local or constitutional conditions may produce such results. But of these things we have as yet no exact knowledge whatever.

The most successful attempt to account for the origin of tumors and cancers was that of Cohenheim. Like Virchow, he sought for the causes of their being in local conditions, but referred their origin to anomalies in embryonic development. He supposed that in the differentiation of the ovum and the cells of the embryo there was in many individuals an excess of material over and above the needs of the organism for the formation of the various tissues, and that the superfluous cells remained as living germs undeveloped among the unfolding structures. He further supposed that while they drew their nutriment from the organism, they were not able on account of their lack of development to establish physiologic relations with it, and came to occupy the position of parasites. Living thus in a condition of latency, they were liable to be stimulated into sudden activity by any chance irritation, and would then begin to grow and multiply, but coming belated into active life would not be able to form normal relations with the body and would develop into tumors.

He accounted for the varieties of tumors on the hypothesis that the malignant kinds dated from the very earliest periods of embryonic existence, when the cells had an enormous power of multiplication, and the more innocent, from a later period after the tissues had become more differentiated. The original chapters in which Cohenheim dilated upon his theory are among the most entertaining in all medical literature, and when we consider that his was the first and, even now, the only intelligent theory in explanation of the origin of these peculiar diseases, we can understand the enthusiasm with which it was received by very many physicians. The immediate result of its publication was to stimulate pathologists to investigate their cases with the view of testing its correctness. Evidences were therefore sought for in all tumors, of an embryonic origin, and the search was rewarded in many cases by finding traces of anomalous development.

The dermoid cysts, the enchondromata of the parotid, certain tumors of the kidneys, the adenomata of the axilla, the rhabdomyomata, and many other

neoplasms were connected with the aberration and sequestration of embryonic tissues. It was, however, quite another thing to establish this as a general law for all tumors and, thus far, research in this direction has only established the fact that certain tumors date from intra-uterine life, while others apparently originate in more or less adult structures. In cancers, and sarcomas especially, the proof of an embryonic origin is lacking. The growth of these tumors differs widely in kind from the growth of embryonic cells. The latter are marked by a vigorous multiplication and growth, in which there occurs a constant succession of new forms. The malignant tumor repeats indefinitely the one form of cell with which it started. The cells of the embryonic increase in numbers vigorously at first, then more slowly, and finally cease to multiply. Those of a sarcoma or cancer become more fruitful as the malady continues, until finally they destroy all the tissues around them. The type of embryonic development then is a rapid propagation of new cells, each new brood of which differs from the mother cells, with a continuous loss of generative momentum. The characteristics of malignant growth are a repetition of one cell form with a continuous gain in generative momentum. It is wrong to regard the embryonic faults where they occur as mere accidents. The peculiarities of the phenomena do not admit of so easy an explanation. Behind the fault in development there is some defect in energy or in the mode of its expression, which causes the fault. This theory of Cohenheim's has been variously modified. Grawitz's theory of "*schlummer zellen*" and Bibbert's of cells which have lost their organic connections would never have seen the light had not their authors read Cohenheim. Among the most fanciful of conceptions must be regarded that of Schleich who conceived the idea that tumors arose by a process of morbid cellular conception. He fancied that under the influence of certain irritations a cell became diseased, and that joining with neighboring cellular elements in a sexual union, produced a morbid progeny. The repetition of these processes led to the formation of those great aggregations which we call tumors. Such speculations, founded on no other basis than the imagination of the author, contribute little to our actual knowledge. The revival of the old theory of parasites, in explanation of the malignant growths, is an index of the insufficiency of the theories which have for thirty years past formed the stimulus to research. The belief that cancers owe their being to a parasitic infection is almost as old as human experience. It is a kind of blind faith to which the mind constantly recurs when all other explanations fail. The existence of many false tumors which are caused by parasitic infection, and the evidently infectious course of malignant tumors gives support to the theory that they too owe their origin to the introduction of living cells from without. One can not study the history of actinomycosis, or that of the coccidia of rabbits without feeling struck with the similarity of the phenomena which they present to those of sarcoma and cancer. So, too, the formation of granulation cells under the stimulus of bacteria suggests possibilities, as regards the origin of those forms of sarcoma, which can not be distinguished from granulation tissue. While we have as yet no positive evidence that the enormous cellular proliferation of sarcoma or cancer is due either to bacteria or to protozoa, there is, nevertheless, nothing in such an hypothesis inherently impossible. The burden of proof, however, must rest on the advocates of the doctrine, and as yet they have not been able to establish their case. The objects observed in the cells of cancer are of such doubtful nature that they have been variously described by different experts as bacilli, protozoa, invaginated epithelium, products of degeneration, leucocytes, etc. No one has as yet succeeded in cultivating the parasite in artificial media, and even the efforts to inoculate it into the healthy animals have been rarely successful. As long as the histologic evidence is so doubtful that every observer feels at liberty to interpret it according to his own prejudices we shall be obliged to defer judgment, or to pronounce it on other grounds. The arguments offered in defense of the parasitic theory of cancer are: 1, the microscopic evidences, the uncertain character of which has just been remarked; 2, the frequent occurrence of auto-inoculation, and the evidently infectious course of the disease in the organism; 3, the endemic occurrence of cancer in certain localities, and in rare instances in the same houses; and, 4, an occasional success in inoculating the disease in healthy animals.

The arguments against it are: 1, the many instances of hereditary tendency; 2, the general failure of experiments of inoculation; 3, the fact that metastases occur, not through the transfer from one point to another of parasitic germs, as is usual in parasitic diseases, but by the transmigration of cells bearing the same characters as the cells of the original tumor, and the subsequent proliferation of the migrating cells; 4, the fact that not only cancers but tumors of all kinds have a more or less tendency to produce metastases; and, 5, the tendency exhibited by embryonic remains and histoid tumors to develop into malignant disease.

It is difficult to understand why, if cancers and sarcoma are parasitic, surgeons who operate often with cut fingers, and nurses who take charge of cancerous sores, never become infected unless, indeed, as has been suggested, the cancer germs have to undergo some transformations out of the body before they can reproduce the disease.

It is very possible that among the sarcomata some may be found arising from this cause, but even though this may be so, we would be as much as ever in the dark as to the causality of those other remaining tumors which could not be explained on that basis. The understanding of actinomycosis has not advanced our knowledge of true tumors, neither would the discovery of other false tumors now reckoned among the neoplasms. Among the influences which predispose to or against the growth of cancers and tumors, race must be considered the most efficient. Detroit has a pretty large colored population, and there is a thick settlement of negroes on the opposite shore in Canada. Detroit physicians, therefore, see a variety of morbid conditions in that race. I think it is the common belief among them that malignant tumors in negroes are very rare. I have seen a great many fibroids and fatty tumors, but never yet a cancer or sarcoma in a pure negro. I believe that the experience of Southern physicians will corroborate my own in this particular. Dr. R. Williams states, on what authority I do not know, that while in 100,000 whites there 27.96 cases of cancer, there are in the same number of blacks only

12.17. I have reason also to believe that tumors of any kind are rare among the Indians. Some years ago I sent a printed circular to the medical men employed at the various Indian agencies in the West, asking for information on that point. The answers that I received were not sufficiently exact and trustworthy to warrant publication, but I gathered from them the information which I have stated. It would be an exceedingly valuable addition to our knowledge if we could secure exact data as to the prevalence of these diseases in various races all over the world. It would be a proper undertaking for the government, but much could be done in that way by international medical associations. As far as appears from the meager evidence on this point, the white and yellow races seem to be most afflicted with malignant disorders, and the black and red races most exempt.

After race, locality would seem to be most important. Certain districts in England and some in this country yield an extraordinary number of cases of cancer, while other places are comparatively immune. Whether this indicates a possible infectious influence in certain soils, or an hereditary tendency to the disease in certain families, is an important question. The facts in regard to the relative frequency of malignant disease in various places are as yet too meager to afford data for argument. The question of heredity, too, has never as yet received that intelligent investigation which can be accomplished only by large numbers of physicians acting in concert. It must be remembered in estimating hereditary influences that every human being represents an immense number of ancestors, and that few of us can go back two or three generations without finding in the direct or collateral lines examples of almost every variety of disease, common to the country and climate.

Let us suppose that a man who died of cancer had thirty grandchildren, and that one of these became cancerous while the other twenty-nine remained immune, how should we reckon the hereditary influence? There are cases undoubtedly in which the cancerous tendency is so marked in certain families as to be unmistakable. There is a form of heredity in cancers and tumors which has been too little studied, and which has an even more important bearing on the question of the essential nature of cancer than the heredity of cancer itself, and that is an heredity marked by an alternation of histoid or other comparatively innocent tumors with cancer or sarcoma.

We might explain the heredity of cancer as we do that of tuberculosis, as merely an hereditary weakness which made the organism liable to parasitic invasion, but if we can establish the fact that the hereditary influence in a given family is not limited to the growth of malignant tumors alone, but exhibits itself in the production of a variety of dissimilar growths, we shall have done much to disprove the whole theory of parasitism. There occurred in my own practice once, some cases illustrating forcibly this tendency. Mr. X. had numerous atheromatous cysts on the scalp which, however, gave him little trouble. He died from other causes. He had two daughters. His oldest died of cancer of the breast. His youngest daughter had numerous cystic tumors on the body. In 1863 she had a large cyst removed from the shoulder, and one shortly after from the thigh, in 1871 one from the head, in 1873 one from the abdomen, and one from under the chin, and in 1875 came to me on account of an ulcerated cyst in the small of the back. I removed this and examined it closely. It had every characteristic of an atheromatous cyst and nothing more. During her convalescence she had an attack of erysipelas, during which I discovered on one shoulder a small sebaceous cyst which had been overlooked. The result of the erysipelas was to cause suppuration in this cyst and the discharge of the usual contents of such formations. She recovered and has been since then, as far as I know, well.

The daughter of the first child of Mr. X. had atheromatous cysts of the scalp. The second child had four children of whom the oldest, a son, had cysts on the head and shoulder.

Her second child was exempt. The third child, a daughter, had cysts on the scalp. The fourth child, a daughter, the wife of a physician, was attacked by a sarcoma of the breast while nursing her only child. I amputated the breast, but she had an immediate and general recurrence and died. Here then were seven persons in three generations affected with tumors. In five, the tumors had the characteristics of ordinary atheromatous and sebaceous cysts. In two, there were malignant tumors causing death. It is impossible to explain such a history on the theory of parasitism. The influence of age and sex, the greater tendency of these diseases to certain parts of the body, and the effect of injuries as predisposing causes, are all too well understood to warrant me in detaining you for their discussion.

In considering the forces which further or retard the growth of neoplasms, we have to take in those dark and hidden influences which our ancestors used to call constitutional. With the advent of cellular pathology, this word has become "taboo" with the pathologists of to-day who boast of their efforts, sometimes crowned with success, to trace all morbid action to local forces. To ascribe maladies to constitutional causes is, in their estimation a confession of ignorance, best to be avoided. In order, however, to explain the immunity of some people to these disorders, as well as the long periods of latency which often exist even with malignant tumors before they manifest their full capacity for growth and infection, it has been necessary to assume the existence of some protective force residing somewhere within the organism. In conformity with the prevailing tendencies, this force has been imagined as inherent in the various tissues of the body, rather than in the body as a whole. Thiersch's theory, adopted and amplified by Cohenheim, assigns to every structure a certain capacity of self-preservation by virtue of which it is enabled to hold its proper place among the tissues and to resist any encroachment of other cells or membranes upon its territory. By virtue of this local force, granulations which fill an open wound to the surface are then inhibited from further growth by the epidermis, which begins, so to speak, to assert its rights and grow over the granulations, as a covering. This local influence, too, holds the adherent embryonic germs in check, and prevents their development until some chance inflammation or injury deprives the tissues of their self-preserving power. Two coinciding conditions are, therefore, held by Cohenheim to be necessary to the development of any tumor, the first of which is the existence among the normal structures of some belated germs, and the second of which is the loss of resisting power on the

part of the surrounding structures. The effect of an injury in producing a neoplasm is supposed to be twofold. It at the same time weakens the normal membranes and stimulates into activity the parasitic cells. All the influences which concern the formation of tumors, whether to favor or hinder their growth, are imagined to be purely local in character. It is a great question whether the facts of pathology justify the total abandonment of the conception of a constitutional something by which the power of an organism to resist injury is determined. The old doctrines of primary humoral dyscrasia are untenable, and we have no plausible hypothesis, as yet, on which we may satisfactorily explain all the phenomena, but we may recognize the existence of things which we can not explain. The constitutional tendencies of individuals to certain maladies, and the immunity enjoyed by other individuals are facts which have to be acknowledged.

A person suffering from cancer is exceedingly liable to auto-inoculation by cancerous material which can not be inoculated into another individual. Surgeons are continually working in that material, often with cut fingers, and yet never infected, although it is a prevailing belief among practical surgeons that recurrence in the patient often takes place from an auto-inoculation during the operation. As such patients may be inoculated on any part of the body, and as all tissues become alike infected, it is impossible to avoid the conclusion that the cancer is after all only the local expression of a general tendency. It is not difficult to imagine that an organism developing from a common center, should in all parts exhibit traits peculiar to itself. All of its component cells, descended from a common matrix, would have nearly the same tendencies and would on occasion tend to show the same strength and the same weakness. While it is not possible for us in any given case to demonstrate in what the constitutional peculiarities of such an organism consist, we must, nevertheless, admit that they exist and make the individual what he is, different from all other individuals, even of his own family. The doctrine that the resisting power inherent in a healthy organism is simply a local force resident in the tissue has never seemed to me to be tenable. When we consider the human body composed as it is of an infinite multitude of cellular elements, each of which may on occasion live an independent life, when we note the perfect coördination with which they perform their functions and with which they multiply and grow with sole reference to the good of the organism, we are struck with wonder and admiration at the perfection of the mechanism. It is inconceivable that such complicated processes are carried on without regulation by some governing center. To insure the perfect nutrition of the body, control must be constantly exercised not only over cell functions, but also over cell generation and multiplication, and though we may conceive this control to be rendered easy by the automatic reactions of the cells to stimulus, we may hardly imagine it as a merely local function. There is no fact more positively certain than that this power of control is exercised in the healthy body with an iron consequence. We see evidence of it in all the processes of nutrition and growth. We see it in the repair of injuries, in which the growth of granulation tissue is permitted to reach the proper level, and then inhibited from further increase, and in which the epidermal cells remain in quiescence until the granulations are prepared for their protective covering, and then grow like a mantle over them. It may be noted in the destruction of all useless tissues. It is a law of the healthy body that all structures which have become worthless for its purpose shall be made to degenerate and disappear. The alveolar process when deprived of its teeth, the synovial membrane, when the joint is kept too long at rest, the muscles of the amputated limb, the generative organs after the change of life, all tend to atrophy or to undergo fatty degeneration. The law which makes existence in the organism depend upon the constant exercise of function is so rigid that a man can not stop the working of any organ without injuring it. If he ceases to think vigorously, his brain grows less, and if he ceases to exercise his muscles they grow weak.

On the other hand, in response to the demands of the organism, organs will increase in size and vigor, just as the one kidney becomes hypertrophied if its neighbor becomes incapacitated.

While the fact of the control on the part of the healthy organism of its component parts is then beyond question, while indeed its very existence as an organism depends upon that control, we are as yet in the dark as to where the controlling force resides and as to how it is exercised. There are some facts which indicate that it may be located in the central nervous system. We may infer this from the disorganization which is apt to follow upon disease of the spinal cord. No one who has seen the diseased joints of locomotor ataxia, the muscular wasting of poliomyelitis, or progressive muscular atrophy, or the sloughing bed-sores which follow upon injuries of the spine, can refuse to recognize the effect of the disorganization of the spinal center upon the nutrition of the body. It is, however, not only in the disorganization which ensues upon the destruction of the spinal cord that we may note this influence, but in an actual growth of tissue which follows upon certain disorders of the nervous centers. Of late, some observations have been made in that peculiar condition called acromegaly which indicates that it is caused by disease of the pituitary body. Acromegaly manifests itself in an abnormal growth of one side of the face, or jaw, or of the hands, or feet, or other parts of the body, and may occur in connection with gigantism. Now, in several cases of this disorder, the pituitary body has been found to be enlarged and apparently diseased.

In pseudo-hypertrophic paralysis and in Graves' disease, there is reason to believe that the abnormal growth of connective tissue in the one malady, and of thyro-glandular tissue in the other are directly due to nervous disturbance. The theory that tumors originated from some trouble of the nervous system is not new.

Virchow quotes Schroeder Vanderkalk, as advocating the doctrine that neoplasms owed their origin to a disease or injury of the central nervous system and the loss thereby of that governing force which regulates cell growth and reproduction, but himself rejects the theory on the ground that paralyzed animals are not especially given to the production of tumors.

This conclusion does not seem to be altogether justified, for while paralytic conditions are more or less apt to lead to disorganization and atrophy rather than growth of tissue, it is not impossible that cell

nutrition and reproduction may be, like some functions of the body, regulated by centers of two ganglia, one of which would stimulate and the other inhibit all proliferation. In that case it may be easily possible that an injury which would totally destroy the spinal cord or cut off all communication with it, would result in disintegration, while one confined to the inhibiting centers might become manifest by a growth of new tissue.

The disorderly growth in acromegaly, marked in many instances by an enlargement of the pituitary body is supposed to depend, not upon the paralysis, but on the over-stimulation of a nervous center. Whatever weight may be eventually accorded to Vanderkalk's theory, it would seem to be a lead worth following. For that which distinguishes the neoplasm from all other morbid enlargements is the fact that the cells which compose it have, in some way, succeeded in escaping control, and in proliferating without regard to the necessities of the organism. This characteristic of a persistent growth of useless tissue and reckless, uncontrollable reproduction is our only criterion of a true tumor. Lücke's definition of a neoplasm "that it is a mass of growing tissue which has no physiologic connection with the organism," does not seem to me to express the whole truth. I should define it rather as a mass of growing cells over whose nutrition and growth the organism had lost control. For this seems to me to be the one essential factor in the growth of any neoplasm.

When one considers the absolute necessity imposed upon a complicated organism, made up of a multitude of semi-independent cells, of holding these, so to speak, in discipline, and obliging them to conform in all their activities to organic law, it becomes apparent that the power of control is that which is most essential to its healthy existence. The loss of that power over any of its parts means something more than a merely local defect or local disease. The commonest fatty tumor has, therefore, in its very existence something portentous. It does not mean merely that a few fat cells have been stimulated to needlessly multiply, but it signifies also that in that organism there is some defect in the mechanism of control. It may mean too that there exists a liability to the development sooner or later of more formidable growths.

For these reasons, I can not but dissent from the prevailing doctrines which ignore all other causes in the production of tumors than those of local significance. There is a tendency in modern pathology to exaggerate the significance of local conditions and operations, and, in the study of cancer, this may be remarked in the undue importance attributed in its causation to local irritations. If we examine, for example, the list for alleged causes of cancer of the lower lip, and for the immunity of the upper we shall find that they will not bear criticism. Tillmann lays great stress on the use of tobacco and brandy, but Bardelsen tells us that the inhabitants of the coast of Pomerania who do not smoke, but who chew tobacco, have frequently cancers of the lip but few of the mouth or fauces. Surely if tobacco causes the disease the reverse ought to be true. All the world uses tobacco and brandy and no persons more so than certain inhabitants of the tropics and yet cancer is said to be rare in the tropics. Thiersch ascribes its prevalence among the peasants to the injuries inflicted on the lower lip by the weekly use of a dull razor but it is frequent, as I can testify, among a class of American farmers who never shave and some of whom use neither brandy nor tobacco.

It is difficult, too, to understand why exposure to the weather, another alleged cause of labial cancer, should not affect the upper as well as the lower lip.

So, too, as regards the occurrence of cancer at the cardiac and pyloric orifices of the stomach and the comparative immunity of the rest of the organ, we read that the greater liability of the cardia and pylorus to insults and injuries is the cause of their greater susceptibility to the disorder—but here arises the question of fact. Are those places more subject to repeated irritations than the mucous membranes of the interior of the stomach? When food passes through those orifices there may be a momentary friction, but is that more irritating than the long presence of great masses of undigestible food, or acid fluids, some of which are absorbed directly through its walls?

It is a notorious fact that the mucous membrane of the stomach is especially exposed to the greatest variety of chemical and mechanical insults and that inflammation is a frequently recurring result of such injuries.

I do not think that any unprejudiced man, examining the facts impartially, would affirm that the extremities of the organ suffered more in this respect than its interior. If repeated cellular irritations cause cancer, how is it that the liver is so rarely affected with the primary disease? It is peculiarly exposed to injury by the frequent passage through its vessels of alcoholic and other irritants, which frequently cause destructive chronic inflammations. As the liver is especially prone to the secondary manifestations of the disease, it can not be said that its comparative immunity from the primary is due to any peculiar power of local resistance. If we wish to get at the truth of the etiology of cancer and tumors it will not do to accept statements with so little criticism.

We have not yet collected the data on which we can found a rational judgment as to the origin of cancer. We do not know, for instance, the relative frequency of the disease among the people who do not use tobacco, or who do and do not shave. That local irritations may excite the growth of neoplasms in some subjects and in some tissues is beyond all question, but this irritation can be but one factor in what is a complicated chain of morbid activities. Whether we can consider the beginning of trouble, with Schroeder Vanderkalk, to lie in a morbid change in some nervous center, or whether we rest content in our present ignorance, to ascribe it to some vague constitutional defect, we must, nevertheless, recognize behind the neoplasm, an impairment of that controlling mechanism, without which no complicated organism can exist. It does not militate against its existence that we are unable to define and locate it. Now if we apply this principle to those tumors which result from anomalies in embryonic development, we shall interpret the phenomena far otherwise than was done by Cohenheim.

To Cohenheim, the occurrence of useless aberrant germs was something merely accidental. While the excess of germinal matter itself was regarded as something fortuitous, its persistence was considered as a matter of course. It did not seem to occur to that investigator there might be in every embryo a

larger supply of germinal matter than is actually needed for the development of the various organs and tissues, and yet there are reasons which I shall not discuss here for believing that that is the case.

Nature is a spendthrift in all that concerns the proliferation of organic bodies. In the development of the embryo there must be a large surplusage of embryonal cells, which have to be disposed of. Whenever embryonal junctions take place, there must be a liability to the infolding and dislocation of germs. When such superfluous and aberrant cells remain undeveloped among the tissues, that which is morbid is not their primary existence, nor their displacement, but their persistence. In the healthy embryo they would be treated like the *débris* of a new building, they would be destroyed and expelled. This disposal of useless material must be a constantly occurring process in every organism which passes through the stages of development in a normal manner. Occasionally an exuberance of growth will be corrected after birth. This may be seen in the frequent disappearance in the early months of life of the milder forms of congenital nævi. A child will be born with numerous stains on the skin, caused by a growth of the minute capillaries, and in a few months they will be no longer perceptible. Sometimes even larger nævi will thus spontaneously lessen in size, and finally vanish, as if the organism were finally perfecting itself and acquiring a late control over its members.

In some cases, indeed, in which the effort to get rid of useless material has been only partially successful, we may see, nevertheless, that the effort has been made. If a supernumerary finger or toe is so located among the digits as to be a useful member, nature is content to leave it undisturbed, but when it grows from the side of the hand or foot, where it is only an inconvenience, she will apparently try to cut it off. Such growths are often formed to hang by a mere thread of tissue, although otherwise quite well developed. We may believe that in many cases the amputation thus begun may have succeeded, and the useless member thus disposed of. The survival then of embryonal remains must indicate something more than an accidental excess of tissue. It means that there exists a congenital defect in the mechanism of control, which if not corrected may lead to danger. Experience shows, indeed, that such imperfect structures are exceedingly liable to malignant degenerations.

In speaking of the loss of control as a defect, it must not be understood that it is always congenital, or always permanent or progressive. We may believe that while certain individuals are born defective in this particular, others become so by the wear and tear of time, and even that, in some cases, the power may be regained by a return of the individual to a state of health. We can imagine that in some cases the loss of power might result from organic change, while in others it would be a mere functional disturbance. We may also suppose that even though the controlling power is weak, it would suffice to maintain order until the occurrence of prolonged local irritations would excite a cellular rebellion, and that a neoplasm once formed would tend to increase the disorder. The extirpation of the tumor and of the disturbed area would in many cases cure the malady, temporarily, at least, by removing an element of contagion, as well as of irritation.

The knowledge that behind the local growth there was a constitutional defect should cause no relaxation in our efforts to get rid of a presence, which, either by scattering seed, or possibly by some catalytic influence, would tend to spread the disorder over new areas. The established fact that cancer may be easily inoculated on the individual who has it, though with great difficulty on healthy persons, shows the influence of constitutional conditions on such growths, but the equally established fact that thorough extirpation will often act curatively for many years, proves no less the influence of local conditions and of the contagion exercised by the disease.

The test, then, of a true tumor is that it is a cellular rebellion. All other morbid enlargements are either established in the interests of the organism, to protect it from harm or to repair injuries, like the inflammatory exudate, or are accidental products of disease, or are tumefactions caused by parasites. The inflammation becomes a cancer when the cellular proliferation takes place, no more in the interests of the organism, but as a wild and purposeless growth. It marks the loss of control, which is one of the worst forms of degeneration.

As regards the treatment of these maladies, whatever success has been obtained has been by complete and thorough extirpation. Whatever the character of a tumor, whether fatty, or fibrous, or cancerous, or embryonic, it always has the tendency to an aggressive growth. While extirpation does not cure the underlying defect, it may and often does prevent it from becoming operative. All that we have gained in treatment has been in the way of earlier and more thorough operative procedures. If we compare the practice of to-day relative to cancer of the breast with that of thirty years ago, we may see best the change which has taken place in this respect. The surgeons of the earlier day rarely operated in the early stages of the disease. Only when the infection had become pronounced was the patient brought to the knife. Care was taken in operating to leave sufficient integument to cover the wound, and the axilla was only opened when the glandular infection had become very apparent.

Now, notwithstanding the many sins still committed in this respect, physicians send many cases to the surgeon as soon as their attention is called to the trouble. In all cases the competent surgeon removes the entire breast, following it up in its many ramifications over and between the pectorals, and everywhere far under the integument. He invariably removes all of the axillary glands, all of the infected skin, the pectoral fascia, and often both pectoral muscles. He explores the sub- and supraclavicular spaces, and extirpates any perceptibly swollen glands, and following the practice of Tiffany, when the inner edge of the breast is involved, he resects a couple of ribs, in order to get the infected glands out from under the sternum, and, finally, if the blood vessels and nerves have become so infiltrated as to preclude recovery by any method of lesser gravity, he may proceed to amputate the arm at the shoulder in order to extirpate the affected tissues.

If we seek from the literature to learn the success of these radical operations, we find ourselves at fault on account of the insufficiency of the statistics. It is impossible to judge from the published statements what proportion of cases were operated on in the early and what in the late stages of the disorder, and

yet, this is the most important point of all to be considered. There is little value in figures which say simply that during a given time at a given place so many cases were operated on and so many recovered, for it is evident that such operations as were undertaken after general infection had been accomplished would entirely vitiate the statistics of those cases subjected to operation in the beginning of the disorder. All that we may safely say, as regards this question, is that a considerable minority of the cases operated on early, possibly 20 per cent., have been radically cured.

The important thing for the profession now to consider is the direction in which we may push our investigations to the best advantage. The hopes which were entertained on the first introduction of the cellular pathology of the speedy solution of the problem of morbid growth have not been realized. We have learned to trace certain tumors to embryonic anomalies, we have been treated to a great number of improved theories. We have added an element to our diagnosis of somewhat uncertain value, but the study of histology has not enabled us to know why certain cells rebel against the organism and grow into it as foes and parasites. Neither may we hope ever to gain that insight by purely histologic studies, for the explanation of physiologic and pathologic processes does not inhere in anatomic knowledge. It is a long way from the knowledge of form to that of function. We can not tell why one cell will secrete gastric juice and another mucus, nor can we tell by examining a cell what it will secrete. For this reason, the exclusive devotion to histologic investigations of the last thirty years has failed to bring the required understanding. Even the efforts to classify tumors according to their cellular genesis have been only partially successful. If, however, we could learn to trace every cell in every tumor back to its early progenitors and follow every step in the acts of the genesis, we should indeed know much that we do not now know, but should nevertheless be as much as ever in the dark regarding the causes and essential nature of the pathologic change. It would be as it is now with a superfluous finger. We know that the finger has originated in superfluous aberrant embryonic cells, but why the unnecessary tissues was formed, and why it was not cut off and destroyed, we do not know. We can not too highly estimate the gain to the world from the line of thought initiated by Rudolph Virchow, and from the painstaking work which has been accomplished in the field of minute anatomy during the last three decades, but we should make a great mistake if we neglected those other sources of knowledge which no less require patience and laborious study. The relations of the cell to the organism can never be understood if we confine our attention to the cell alone. We must study also that complex mechanism which out of a multitude of cells makes an organism. The secret of the neoplasm is hidden in the laws of organic control. This most evasive of physiologic laws may never be fully understood, but it at least, calls for an effort at investigation. We need a much more complete knowledge of the functions of nervous centers. The post-mortem examinations of patients dying of tumors or cancers should not be confined to cellular changes exhibited by the growths, but should be extended to the sympathetic ganglia and the central nervous system. Perchance in the spinal cord, pituitary body or some large mass of ganglionic cells, we may be able to locate the original seat of trouble. If the results of such examinations should prove to be altogether negative, they would still have been of service.

There are many relations of tumors to the organism and to each other which have never yet been ascertained. We have never yet learned in any exact way the relations of the more innocent to the more malignant growths. Whether a man who has a fatty tumor is more liable than another to cancer, whether the persistence of useless embryonic remains indicate a constitutional or local defect, whether the benigner tumors occur in a community in the same relative proportion as the malignant growths, and whether they are alternate with one another in cases of proved heredity, these, and a multitude of others are questions to which, with our present knowledge we can give no satisfactory answer. One difficulty in eliciting satisfactory information is the length of time over which the history of a cancer stretches. One must know the medical records of several generations to be able to correctly judge of a given case.

It is exceedingly important to determine, if possible, the real truth regarding the alleged parasitism of cancer and sarcoma. This ought not to be the most difficult of the difficult problems to be solved in this study. If we ask what the profession can do, that it has not done to make these researches more intelligently and efficiently, the answer would perhaps be this, that while individuals in the profession have made most laborious researches in special directions, there has never yet been that systematic well-directed coöperative investigation of these diseases which promises the best returns.

The men who have chiefly studied these maladies, have been the school men in their hospitals and laboratories. But there is a vast amount of information needed which can never be acquired from such sources. What can the hospital surgeon or the pathologist in his laboratory learn, except at second hand, of the racial peculiarities of these diseases or of the family tendencies, or of the endemic relations of soil and water, or of similar troubles of the lower animals, or of the modes of life of the persons affected. While the hospital and laboratory work will probably always occupy the first place in these researches, there are other lines of investigation which we can not afford to neglect.

The French have recently formed a society called the League against Cancer, whose object is to institute a crusade against the malignant diseases. I am inclined to think that some of the more stolid Anglo-Saxons regard the movement as fantastic, and yet the work which could be accomplished by such an association of enthusiastic observers might be invaluable. Instead of the limited investigations of specialists in narrow fields, there could be instituted a comprehensive scheme of inquiry, by which every possible source of knowledge could be probed to its depths. The etiology of all true tumors and cancers, in their relations to the numerous animal species as well as human races, and as influenced by civilization, habits of life, hereditary, climate, water supplies, and all endemic conditions, could be studied in a way that would give us exact scientific data instead of the no knowledge which we possess to-day. The influence of hereditary syphilis to which the elder Gross and after him Esmarch have ascribed the origin of

certain so-called sarcomata, could be made the subject of special study.

The practicing physicians who more than any one else have access to the facts upon which our doctrines of hereditary transmission rest, could be interested in keeping exact records on blanks furnished them by the association. Boards of health could be stimulated to use the material at hand for scientific research.

In every large city, competent pathologists and histologists could be appointed and paid, for carefully examining and reporting on all tumors sent to them by physicians living within a certain radius, and printed instructions, directing in detail the methods of investigating cases, making post-mortems, and preserving the morbid specimens, could be sent to all applying for them. Veterinary surgeons could be enlisted in the work for the purpose of bringing to our aid the knowledge to be gained from the study of comparative pathology, and the experiments which we are forbidden to make on the human subject could be instituted on the lower animals. Medical colleges could be invited to add to their clinics for the treatment of human maladies, clinics for the domestic animals which would then provide the material for study. The various governments of the world could be asked to collect careful statistics as to the prevalence of these diseases among the many peoples.

Physicians could be better instructed in the means of diagnosis and in the necessity of early operative treatment. And last, but not least, the laity, admitted to the association could be induced to assist, not only with liberal contributions of means, but also by that intelligent coöperation which would lessen our difficulties in collecting evidence and making post-mortems and keep the sufferers out of the hands of the quacks.

It seems to me that there can be no question of the utility of a project which would put the direction of the investigations in the hands of the best men in the profession, and which could enlist even its humblest in the work of supplying the necessary knowledge. The movement of the French society deserves our applause and sympathy, and we should manifest our approval by taking measures for effective coöperation.

It is fitting that this society, composed of the flower of the profession of the great Mississippi Valley should assume the initiative in this country in effecting an organization for this purpose.

SANITATION IN STREET PAVEMENT.

Read in the Section on State Medicine at the Forty-sixth Annual Meeting of the American Medical Association, held at Baltimore, Md., May 7-10, 1895.

BY HENRY O. MARCY, M.D.

BOSTON, MASS.

One of the most interesting problems of modern sanitation is found in the making and maintaining of the roadbed in the streets of all our larger cities. The dangers therefrom consist chiefly in the atmospheric contamination induced by the great variety of material which necessarily collects upon the roadway and is usually denominated as dust. This, when it is wet, is generally considered as mud, but is better stigmatized by the use of the English acceptation of the word "nasty." When dry, as dust, the atmospheric currents disseminate it in all directions. This the passers-by must often inhale and, by any means yet known, it can not be excluded from the neighboring houses. In great measure, dust is the bane of the housekeeper in urban surroundings. In character it is composite, consisting chiefly of the pulverized material from the surface of the roadbed, mixed with animal excreta, incident to ordinary travel. Under favorable conditions of heat, moisture, etc., these furnish the media for the development and dissemination of disease germs. Infective bacteria are almost never absent from street dust, and they often find an easy entrance into the human economy by means of respiration. So long ago as 1883, I cultivated various forms of bacteria taken from excavations at different depths beneath the best streets in the city of Boston, a noteworthy illustration of which, published at the time, was taken from Beacon Street, opposite the Public Garden, a considerable distance beneath the surface.

Dr. Sternberg, the present Surgeon-General of the United States Army, was one of the first scientists to call attention to these dangers, and after reporting the results of his investigations upon the filth of cities, as dangerous in large degree, because of septic organisms, wrote: "It must be remembered that the gutter mud of to-day, with its deadly septic organisms, is the dust of to-morrow, which, in respiration, is deposited upon the mucous membrane of the respiratory passages of those who breathe the air loaded with it."

In a circular just issued by the State Board of Health of Massachusetts, indorsed and circulated by the Boston Board of Health, emphasis is made upon the danger arising from the dissemination of the bacilli of tuberculosis. I quote briefly: "Consumption is the most destructive disease of New England; the number of persons dying annually from this cause in Massachusetts alone, amounting to nearly six thousand. The disease is infectious. The chief danger exists in the expectoration of the sick; and if this expectoration is destroyed, little danger is to be feared. Consumptives should be instructed not to spit in open places, "nor in the streets." Remember, the sputa must never be allowed to dry. One of the most common forms of the dissemination of consumption is by the respiration of street dust, never free from infectious material."

Dr. George Baird, discussing the subject of "Sanitation in Street Paving," writes as follows: "Should sanitarians be consulted by municipal authorities in reference to the material used for street paving, and the manner of laying it so as best to protect the lives and health of the citizens?" To this question there should be only an affirmative answer. The macadam road, the cobble pavement, the wood pavement in its various forms, and the granite pavement have all been found more or less objectionable from a sanitary standpoint. The macadam, with its rapidly worn surface and its clouds of dust, carrying disease germs in them; the cobble pavement, with its noise and innumerable pockets, furnishing lodging places for decaying animal and vegetable matter; the wooden pavement, decaying in a few years, and absorbing urine of horses and foul liquids of all kinds which are poured out upon its surface; and the granite, with its noise far exceeding the cobble, its slippery surface when worn, and its open crevices between the blocks, permitting liquids of all kinds to pass down and pollute the street surface beneath, are

each and all of them subject to adverse criticism."

The least unsanitary of all pavement must be impenetrable, present a surface easily cleaned and be kept as free as possible from dust and dirt. The important questions of expense, durability and economy of repair, are the determining factors in the selection of pavement material. In streets subject to the heaviest of teaming, where the weight of the constantly passing load, the minimum resistance offered to traction are important desiderata, it is necessary not alone to have a firm foundation, but also of the first importance to have a surface highly resistant to wear. For this purpose, granite blocks are in much favor. But they should be put down by the pouring of hot asphalt or some of the tarry products, filling the interstices. In this way we have an unyielding, comparatively even-wearing surface, giving a good foothold for the horses' feet, and at the same time easily cleaned and impenetrable to fluids. Although noisy and expensive, it is perhaps the best adapted for service in this class of streets.

In the residence portions of a city, such pavement is undesirable, and at present some form of macadam is more commonly used. In the form of macadam, with or without the Telford foundation of large stones, crushed rock has been used as a road covering in Europe and America for nearly a century. Macadamized surfaces become more or less rapidly worn; the wearing is produced by the pulverization of its surface, which, when dry, is a dust more or less mingled with vegetable and animal matter. When wet, it is mud. This surface is costly to keep in repair and is cleaned with much difficulty. In fact, it can never be freed entirely from objectionable material.

Asphalt, on the contrary, forms an impenetrable surface, is easily cleaned and can be kept clean at small cost. It is comparatively noiseless, is durable and can be easily repaired. Its first cost is greater than macadam.

From a paper published the present year by the Renssellaer Society of Engineers of Troy, N. Y., for the use of professors and students of the Institute, by J. M. Howard, upon "Natural Asphalt and Its Compounds," I quote: "The civilization of cities can be gauged by the condition of their streets. The suppression of noise and dirt, made possible by asphalt pavements, in a great measure determines the character and progress of a city. . . . Jan. 1, 1894, the total asphalt street pavements of European cities are as follows: London, twenty-four miles; Paris, twenty-six miles; Berlin, eighty three miles.

"In the United States and Canada, Trinidad asphalt, 911 miles; asphaltic limestone and other asphaltic materials, 51 miles. The volume of this industry is measured by the fact that the one branch, asphaltic paving, is found in more than ninety-one American and fifty-five European cities. This means an investment of at least fifty-five millions of municipal funds and a working capital, if combined, of $15,000,000."

A publication upon asphaltum in 1893, from the United States Department of the Interior, by Richardson and Parker, under the head of the durability of asphalt pavements, gives the following: "With the best materials, combined and laid with the greatest skill, where traffic is of the ordinary character, and the street not too narrow, so as to confine the wheels to ruts, the life of the pavement should be fifteen years. There are surfaces in existence today which are of that age, which have had scarcely any repairs and seem to be good for many years to come. Such a pavement can be seen in front of the Arlington Hotel on Vermont Avenue, Washington."

Washington is to-day known as the best paved city in America. Its seventy miles of smooth, durable asphalt afford roads which for comfort, convenience and economy of transit are unequalled.

Asphalt offers a smooth and uniform surface, which reduces the force of the traction and thereby effects an economy in transportation, and at the same time adds to the comfort of every person who rides in a carriage; in its cleanliness, containing no joints to collect street filth and give it off in dust, and no vegetable matter to decay and poison the air with noxious germs; in its noiselessness, which relieves the racket and roar of great cities, so trying to the nerves.

These excellent qualities are not denied by any one. Two defects have been alleged against it: 1, that it is slippery; 2, that it is not durable. Neither allegation is founded in fact. Careful observations by competent engineers have established the fact that under ordinary conditions of weather the number of accidents to horses from falling is greater on stone than on asphalt pavements.

The great cause of horses slipping on asphalt pavement is the foreign material which may be allowed to remain on it. For example, the slipping of the pedestrian who inadvertently steps upon a banana peel left upon the sidewalk.

When in Paris in 1890, I examined carefully a piece of roadbed on one of the public thoroughfares, laid in 1812, probably the oldest asphalt pavement in existence. The surface was even, without cracks. When put down, it was eight inches thick, and the constant service of nearly eighty years was said to have reduced its thickness less than one inch.

In Hamburg, I was shown an excellent piece of asphalt pavement, which was put down in 1840. I might refer to our own experiences in Boston, but they have not been as satisfactory. The asphalt first laid here was defective, improper material being used. The trouble is in the asphalt sheet being quite too thin. The more recent paving with the asphalt has been much better constructed.

The repairs to such a pavement are really quite difficult to make. "If the day is cold when they are undertaken, the old surface is in a contracted condition, while the new material put in, being in a heated condition is considerably expanded. If the patch is left perfectly level with the surrounding pavement when finished, it soon settles and forms a little depression. In hot summer weather the expansion of the surrounding pavement has a tendency to push this patch on every side and make it rise above the surface surrounding it, causing a ridge. In making these patches it is customary to cut through the asphalt coating with heavy chisels, so that the part to be repaired can be removed. Then the hot mixture of asphalt and other materials is rammed into the place and tamped and rubbed with hot iron implements until it is apparently united with the old coating around it and the foundation below. It requires considerable skill and experience to do this well, and even the best men fail at times. Recently a special machine has been designed to facilitate and improve such repairs, which has been highly recom-

mended in several cities where it is used. It consists of a sheet metal tank containing gasoline and mounted on a pair of wheels so that it can be easily moved from place to place. Behind the tank is a collection of burners so arranged that when the vaporized gasoline is forced through them by means of a small air-pump attached to the tank, the several jets of flame warm up the surface of the asphalt below them. The material becomes as soft as when first laid, and while in this condition enough of it is taken off from the injured portions by a hoe to secure a clean fresh surface. On this, fresh asphalt is rammed and rolled to the desired surface, and as the old and new material is at about the same temperature when the tamping begins, it has been found possible to weld the whole together into a homogeneous mass. Another advantage of this method of repairs is that asphalt is removed from half an inch to an inch in thickness so that not only is less new material used, but the thin coating is more easily rolled and tamped and less likely to contract and leave a depression."

The present month Hon. E. P. North, in charge of the street paving of New York city, presented his report for the paving to be accomplished the ensuing year. It includes 109,025 square yards, at an estimated cost of $780,100. Coming from such an authority and as the result of long study and observation, I have thought it advisable to quote from the report quite freely:

"This proposal is in conformity with your general instructions to expend the public money for the greatest public good by providing asphalt pavements in the poorer and more densely populated portions of the city and on streets that are likely to become great thoroughfares. The larger sum is expended for asphalt pavements, instead of granite and trap pavements, and the money is expended either in the service of the poorer portion of the community, or in the service of all by increasing the facilities for communication between all parts of the city.

"Somewhat over 63 per cent. of the pavements relaid since and including 1889 have been granite or trap pavements, and rather less than 37 per cent. asphalt. Of the 1,196,079 square yards of asphalt pavement now laid in this city, between 60 and 70 per cent. has been laid in the area bounded by Fourth Street on the south, Third Avenue on the east, on the west by Seventh Avenue to Fifty-ninth Street, and thence north along the Hudson River. These boundaries, somewhat roughly, include the habitations of the wealthier portions of our population.

"Most of the asphalt in this region has been laid in short lengths, which do not average, in the cross streets, a block and a half long, there being over sixty separate pieces a full block or less in length. Some of these are without connection with other asphalted streets, so that much of the work done in this area has been a matter of luxury and convenience to those living on such streets, and is not calculated to appreciably affect either the death rate or the general health of the city, and its utility where it can not be incorporated in a general scheme is practically confined to the immediate vicinity in which it is laid.

"In the project now submitted, the only region favored is that occupied by our wage earning population, and aside from this, nothing has been incorporated that does not serve large areas and all classes of people. The principle has been to continue the very necessary work, in a sanitary point of view, commenced under our predecessor, mainly through the efforts of your consulting engineer, Mr. Towle, of asphalting the streets in the overcrowded districts east of the Bowery, to which is added the populous regions about the Five Points. In addition to this, streets have been selected for asphalt pavement that will extend the present lines of transportation and open routes across the city which will cheapen the delivery of goods and give comfortable access to some of the more important ferries.

"Two and four-tenths per cent. of the proposed work is south of Chambers Street, in the business part of the city; 40.6 per cent. is in regions east of Centre Street and south of First Street, and 57 per cent. is devoted to routes of distribution. Of this only 22.3 per cent. is in that division of the city which contains between 60 and 70 per cent. of the asphalt now laid. So that in fact 77.7 per cent. of the proposed new work will be where most needed for sanitary purposes, in the lower parts of the city.

"It seems that as a financial measure there is sound economy in replacing our wornout pavements with asphalt. It is, however, as a sanitary appliance that an asphalt pavement presents the greatest value. It is nearly a non-absorbent, is free from cracks that offer lurking places for disease germs, and can be thoroughly washed whenever it is thought advisable.

"Leaving the streets that swarm with the children of our poorest population paved with rough stones, the interstices between which are filled with disease-breeding filth, while the streets bordering on Fifth Avenue are paved with asphalt, does not make for the greatest good to the greatest number, and in case of a serious epidemic the practice imperils the health of the entire city."

The attention of the public is being drawn more at present to the proper construction of roadbeds than perhaps ever before. Previous to the development of the railroad system in the United States, however, it is interesting to note the engrossing attention which former generations gave to the improvement of internal intercommunication throughout the older States. It was well understood by them that good roads are desirable on the highest economic grounds, not to speak of their value when judged from the esthetic point of view. The revival of this spirit has been especially noteworthy in Massachusetts during the last few years, largely brought about by one of her indefatigable public-spirited citizens, Col. Albert A. Pope, seconded by his cohorts of bicyclists.

Massachusetts has a State Highway Commission, appointed for the supervision of the construction of new, and rebuilding of old roads. Her appropriation of last year was expended in making short pieces of thoroughly good country roads, in selected parts of the State, in large measure as object lessons for instruction. This year her Legislature appropriates $300,000 for the further prosecution of this popular work.

The attention of scientists all over the world has been directed anew to the development of improved methods of road building, and Congress has recently made an appropriation for the investigation of this subject, in order that information upon the best methods of road making may be widely discussed and disseminated.

Laboratory work is being carried on at Harvard

University upon the value of the different kinds of stones best adapted to road building.

In Massachusetts, the towns are taking up the subject and the dissemination of the good work in this important branch of internal improvements is thus permeating the entire State. This work is not limited to Massachusetts, since a number of the States have already passed new road laws, and the subject is being popularly discussed throughout the entire country. Especially in urban life is the sanitation of the street of the greatest importance, and it seems to me most fitting that the scientific men of the country should exercise a molding influence upon the development of this great public improvement. I have therefore deemed it fitting to ask the attention of the members of the Section in State Medicine of the AMERICAN MEDICAL ASSOCIATION to this subject and to give it due discussion and deliberation.

The subjoined letters are of interest and value. They represent purposely, several of our larger cities in widely varying latitudes with marked variations of climate:

CHIEF SANITARY INSPECTOR'S OFFICE,
ATLANTA, GA., July 23, 1894.

HENRY O. MARCY, M.D.—*Dear Sir:*—Your letter of July 20 to hand, and in reply will state that I consider the "asphalt paving" the prettiest paving for your avenues in Boston; it is easily kept clean, is noiseless, and would give entire satisfaction. Any further information I will gladly furnish.

Very respectfully, THOS. E. VEAL, Chief Inspector.

CITY SURVEYOR'S OFFICE.
MONTREAL, CAN., July 23, 1894.

HENRY O. MARCY, M.D.—*Dear Sir:*—I am in receipt of your letter of July 20, asking me for my opinion as to the best pavement to be used for a residental street with light traffic thereon. I would certainly recommend Trinidad asphalt. We have had Trinidad asphalt laid by the Warren Scharff Co., of New York, and it has stood this climate for seven years with heavy traffic. Yours truly,

P. W. ST. GEORGE, City Surveyor.

OFFICE OF CITY ENGINEER,
SAVANNAH, GA., July 23, 1894.

HENRY O. MARCY, M.D.—*Dear Sir:*—Your note of July 20 came to hand and contents noted. The city of Savannah has a great many streets paved with asphalt, and it gives entire satisfaction. The Warren Scharff Paving Co. has done most of our work. It stands heavy traffic as well as light. I am yours respectfully,

JOHN FITZGERALD, Sup't Streets.

DEPARTMENT OF PUBLIC WORKS,
CHICAGO, July 23, 1894.

HENRY O. MARCY, M.D.—*Dear Sir:*—Your favor of July 20, relative to asphalt pavement received. We have 16.65 miles of sheet asphalt streets in this city. This class of improvement when well laid has given general satisfaction on resident streets in this city. Dearborn Avenue, which was improved with asphalt eleven years ago, has just been repaired at an expense to the city of $570. It is now in as perfect condition as it was when originally completed.

Yours very truly, JOHN MCCARTHY,
Superintendent of Streets.

DEPARTMENT OF PUBLIC WORKS, COMMISSIONER'S OFFICE,
No. 31 CHAMBERS STREET, NEW YORK, July 24, 1894.

HENRY O. MARCY, M.D.—*Dear Sir:*—In answer to your inquiry of July 20, regarding experience in this city with asphalt pavements, I beg to say that the experience of the last six years has shown good asphalt to be the very best pavement for residental streets and on streets used for pleasure driving, provided the grades are not too steep; that is, not to exceed 4 in 100. It has many advantages over macadam or stone, in being noiseless, impervious to liquid filth, easy to keep clean, and about one-fourth less expensive to maintain. We have now in this city fifty-five miles of asphalt pavement, nearly all in private residental and tenement-house districts. Very respectfully,

MICHAEL T. DALY,
Commissioner of Public Works.

STREET DEPARTMENT, STREET COMMISSIONER'S OFFICE,
ST. LOUIS, MO., July 24, 1894.

HENRY O. MARCY, M.D.—*Dear Sir:*—Answering your favor of July 20, would say that we have a little over nine miles of asphaltum streets in St. Louis, and they are giving entire satisfaction to the tax-payers. We have not confined the use of asphaltum streets to light trafic alone, as we have roadways here paved with that material over which from 5,000 to 7,000 vehicles pass daily with loads of from 1,000 to 10,000 pounds. Personally and officially I am in favor of asphalt for paving all classes of streets.

Very respectfully, M. J. MURPHY,
Street Commissioner.

PHYSICAL EDUCATION IN CHILDHOOD AND YOUTH A MEANS OF PREVENTING DISEASE.

Read in the Section on State Medicine, at the Forty-sixth Annual Meeting of the American Medical Association, at Baltimore, Md., May 7-10, 1895.

BY C. F. ULRICH, A.M., M.D.
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The time is rapidly approaching when the prevention of disease will be regarded as of infinitely more importance than its cure. The medical profession, although not absolutely pure, is *par excellence*, a benevolent and unselfish body. Where will you find a set of men who do so much for the general welfare, although their efforts tend continually to diminish their own profits and curtail their own income, as the medical brotherhood? Herculean labors have been performed by the fraternity to improve the water supply of our cities for the purpose of preventing disease and diminishing the death rate. Jenner's discovery, aided by a highly improved system of quarantine, has so diminished the ravages of variola that it is no longer a terror to any community, and its approach is not dreaded as in times past. Cholera has not the same terrors for us now that it had in days of yore. Although Professor Koch's discovery of tuberculin was prematurely launched into the world and has consequently disappointed the expectations of its friends, it is only a question of time, and not a very long time, until this discovery is supplemented by others that will enable us to come as near stamping out that fatal scourge as we have the smallpox. Diphtheria has hitherto baffled our efforts, and continued to slay its thousands. But the discovery of antitoxin bids fair to remand that much dreaded disease to the list of those which we have under our control. The unselfish physician is persevering in his unfaltering efforts to prevent disease; or at least to soften its asperity and shorten its duration; notwithstanding this work seems to go directly against his private interest, in removing to a great extent the source of his income.

There is, however, one prolific source of disease, or at least tendency to disease, of which I have heard very little mention made in medical societies, nor have I read anything about it in medical journals. I refer to the neglect of physical training in childhood and youth. In the earlier ages of the world, when war and the chase formed the principal occupations of the human race, there was not so much need of admonition on this subject. The male child, in its tenderest years, was taken in hand and instructed in running, leaping, hurling the javelin and bending the bow, to prepare it for the life it was destined to lead when it reached the period of manhood. The barbaric tribes knew the necessity of health and strength in the mother to enable her to bear healthy

children. They accordingly trained their female infants in the exercises that were necessary to prepare them for the duties devolving upon them in womanhood. In our modern exotic civilization, the idea of the necessity for such early training seems to have been lost sight of. Intellectual culture, money-making and general business habits seem to occupy the entire attention of our people at the present time.

A child inheriting a weak constitution from its parents, whose physical development has been neglected by parents who devoted themselves exclusively to intellectual or financial pursuits, or to fashionable follies, is sent to school to be crammed with evanescent knowledge, instead of having its physical organization developed and trained to endure the hardships of life, and its intellectual faculties drawn out to enable it to think for itself and acquire the necessary education after its school days are over. This child is required to sit at the school desk from four to six hours every day, trying to absorb knowledge, perhaps to be forgotten in a few months after leaving school. There is not even any supervision exercised over the position of the child's body, and frequently the naturally weak child comes out of school with stooped shoulders or lateral curvature of the spine. The general circulation not being promoted by judicious and methodical training, the child is pale and flabby, drags itself along like an invalid of long standing, loses even its ambition to excel in the intellectual pursuits that first inspired it, and sometimes becomes a burden to itself and its friends.

If the child is of an active disposition, fond of physical exercise, it will sit during school hours fidgeting about, anxious for the recess or intermission to be announced. Then it will rush out, leap, run and bound like some wild animal escaped from the cage, perhaps doing itself an injury. There will be no system about the exercise, some organs being worked too much and others not enough. The body will be overheated and the muscles tired out. The body is not refreshed and the mind not rested. The blood that has been overheated will cool off too rapidly and a revulsion will set in. The muscles that have been overworked will be tired out and sore, being relaxed and unfit for duty the next day. The heart, that great machine that keeps the body alive, as well as the mind, by supplying the necessary nutriment, being overexcited, gradually loses its strength, becomes flabby; dilatations and valvular insufficiency are established. The buoyant health and strength that this child started with, which was perhaps the only heritage it received, is lost by mismanagement; the foundations of life sapped, and its future prospects destroyed.

Take, now, another class; those who, although not robust but rather of a delicate physique, are not suffering from any constitutional debility. We will suppose these children to be of a studious nature, possessing a large and active brain, with no particular desire for physical exercise. Such children go to school, sit in their confined seats, devoted to their studies. When recess is called they feel a bodily languor that makes them feel indisposed to move about and exercise their limbs. They prefer to remain in the schoolroom and study their lessons. When school is dismissed they drag themselves languidly along the street to their homes. They do not engage in the sports of their companions for they are always tired. They are pale and thin; their flesh is flabby; the heart beats feebly; the brain is always in a state of excitement, and frequently a hectic flush is seen on their cheeks.

Let us now look at the child that has been systematically trained in all those physical exercises that develop the muscles without breaking them down; that strengthen and regulate the nerves without unduly exciting them; that cause a regular and healthy circulation of the blood without overheating it or allowing it to stagnate. If such a child has inherited a good constitution this course of training will still further improve it. The child of weak constitution, by such a course, will be strengthened and improved until its cachectic condition has almost disappeared; although, of course, it is not as robust as the one that began life with an inheritance of good health.

Now let us compare two children that are stricken down by disease; one whose physical training has been neglected, whose condition is as I have described above, and one whose physical forces have been well developed by a judicious course of training. Let us suppose that pneumonia is the disease that has attacked these two children. Which one will have the better prospect for recovery? The strong child has, by skillful training, developed all its organs, especially the lungs, which, by continual exercise under the supervision of a competent instructor, have been well developed and are consequently able to throw off the products of the disease, or even resist the attacks altogether, while the child whose physical education has been entirely neglected, who has been allowed to sit bent up in the schoolroom, having little or no play of the lungs; either not going out on the playground at all, or endeavoring to play with the stronger, more robust and more active children, overdoing itself and leaving its lungs in a worse condition than before, has to succumb to the terrible disease.

Take a case of typhoid fever and see how the two will fare. In this, as in other fevers, the heart has to double, treble, or even quadruple the work that is required of it in health. Now, which heart will be able to accomplish it without coming to grief? You all know it will be the heart of the strong child, the one that has enjoyed good physical training and has been strengthened by a judicious and well regulated course of exercise; while the weak and flabby heart, with its imperfect valves, its thin walls, its dilated ventricles, which is scarcely able to perform its work when no disease is present, is sure to fail when double even quadruple the labor is required of it. In typhoid fever we have a diseased condition of the intestines near the ileocecal valve. Frequently, the coats of the intestines in this region are very much thinned. During the period of convalescence, when the patient begins to eat, owing to the slow digestion gases accumulate in the bowels, rupture of the intestinal coats takes place and death ensues. In which patient is this more likely to occur? In the one whose organs and tissues, owing to a good physical development, are all in a sound and healthy condition, able to endure a strain, to throw off the products of the disease, to resist the encroachment of the destroying malady; or in the one who is weak, the muscular coat of whose intestines has lost its peristaltic power, rendering it unable to carry off the products of the disease, which are thus permitted to remain stationary, preying still

farther on the tissues until they become thin, unelastic and friable.

Consider another class of diseases, a product of our modern civilization, of which the ancients knew nothing; nervous affections. I presume no one will hesitate to decide which class is most liable to these affections. The man or woman who has been properly trained, the intellectual and physical powers having been developed *pari passu*, whose organization is well balanced; the brain with its dependencies; the nervous system; the muscular system, with its locomotive powers; the alimentary tract; the assimilative apparatus, as well as all the emunctories, in good condition as a result of a sensible course of physical training in childhood and youth, will surely be less affected by nervous disorders and their concomitant pain and misery than the pale, weak, flabby being that is in every respect the reverse of the one I have just described.

It is hardly necessary to say anything as to the causes that render such persons amenable to all kinds of nervous diseases, for I am sure every one of you can see it at a glance. When one of these nervous, excitable creatures is attacked by fever, no matter what may be its character, it is easy to foresee the result. There is no power of resistance and the patient must succumb. Should this person, nevertheless, survive the attack, he or she would remain a wreck and life would be a burden. It is unnecessary to multiply instances as the matter is self-evident, and every physician, yes, every intelligent layman will see it as soon as it is suggested to him.

I remember when I was a boy, the men in my native land, Germany, were not very robust, because they devoted themselves to intellectual pursuits without giving proper care to the condition of their bodily functions and powers. About forty-five or fifty years ago, Father Jahn, as he was popularly called, organized gymnastic societies, known as the Turnerbund. The young men, with great enthusiasm, affiliated with this association. Teachers were appointed; regular systematic instructions were imparted and the youth of the period became more and more athletic. When Prussia assumed the lead in the German confederation, thorough military drill was superadded to the gymnastic training, and the German people became a nation of athletes, recovering the reputation for strength and size of limb they enjoyed in the days of Tacitus, the ancient Roman historian. When, after an absence of half a century, I revisited my native land I was astonished to find so large a proportion of the population large, strong and athletic. Nor had they suffered in intellect by this physical growth, as was very plainly shown by their artistic, scientific, literary and educational display at the World's Fair in 1893.

Having now shown, I hope, to your satisfaction, the importance, yes, the absolute necessity of early physical training, and its remarkable influence on the health of, not only the present, but also future generations, and its great bearing on the physical and intellectual welfare of the human race, I will close these remarks by expressing the hope that our sanitarians will take the subject into consideration and see if something can not be done to promote a wise system of physical training, in connection with our intellectual education, which would certainly be an excellent safeguard against deterioration, both physical and intellectual, and would surely do more to advance our people to the highest degree of culture than the present system of cramming the brain with evanescent knowledge, and allowing the physical powers to dwindle away, a prey to the ravages of disease and death. According to the laws of heredity and the survival of the fittest, the time would not be very far distant when the earth would be peopled with a healthy, strong and intellectual race, among whom sickness, suffering and premature death would be the exception and not the rule.

THE HYGIENIC AND SCIENTIFIC VALUE OF EXAMINATIONS OF THE EYES AND EARS OF SCHOOL CHILDREN.

Read in the Section on State Medicine at the Forty-sixth Annual Meeting of the American Medical Association, at Baltimore, Md., May 7-10. 1895.

BY B. ALEX. RANDALL, M.A., M.D.

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Much work has been done in the last half century for the improvement of the hygiene of the school, with the result of formulating with much precision the best arrangement of the school building as regards site, plan, ventilation and illumination, and much of this is continually being put into practice with ever-growing advance in these matters of the school surroundings. The parallel and equally important field of educational methods has also been well worked by the pedagogues and others in response to the protest as to overburdened pupils; and while the standards of requirement have advanced and educational forcing has continued unabated, it is probable that the resulting damage has been materially lessened. More sweeping application of the rules generally accepted as requisite, is alone needful to place this aspect of the matter in fairly satisfactory shape.

Forced into rather wholesale dealing with their scholars by large classes and the pressure of changing methods of instruction, the teachers as a class are yet sedulously careful of the health of their pupils and often nobly self-sacrificing in their efforts to save them from any injury in the educational process. Were they enabled to make more discriminating application of preventive care to the cases requiring it, much more might be accomplished through the agencies already more or less practically in existence. The conditions surrounding the scholar have greatly improved; yet near-sight and many more certain evils have been little if at all decreased.

The difficulty is not so much with the machine methods as with the material submitted to them. The hygiene of the school may be perfect; yet that of the scholar very poor. Collective methods have their value—often great; but the application to individual cases may not only fail of good, but even be productive of much injury. Perfectly hygienic school surroundings with moderate demands upon the eyes may save the majority of pupils from trouble, palliate the defective relations of others, and yet spread disaster among a notable minority. Very injurious home surroundings undermine the advantages of the most perfect sanitation in the school, and can be met only by personal examination of the scholars and the exclusion of the unfit from school tasks. Preventive measures can be only partially applied to the whole school population; while their application to the individuals most in need, will generally come only after some damage has become irretrievable, if

we wait for the conditions to force themselves into notice.

To the oculist it is needless to specify what are the evils to be thus combated; for his practice daily exemplifies them most sadly. To the general practitioner it may be well to explain that the "myopia in the schools" of which he may have heard much, is but one element and not the most important. Would-be evolutionists may claim that the near-sight is an adaptation of the eye to the tasks of its civilized environment. On the other hand, the inflammatory intra-ocular conditions such as cause myopia may wreak their ill-effects in other ways and gain serious headway before the vision is affected or unmistakable evidence of injury appears to any one except the ophthalmoscopist. To his methods, alone, will appear the optical defects of the eye which frequently are the cause of trouble and demand correction by glasses. Any medical man or an intelligent layman can quickly learn to make the rest of the tests, just as Dr. Thomson has arranged for examination of the railroad employes by non-medical clerks. These tests are as really outside of the habitual work of the general practitioner as of the school teacher; and it is merely a question of the individual, as to how perfect or how worthless may be the results obtained. The skillful use of the ophthalmoscope constitutes the acme of the difficulty of the work, while it is also its most valuable part, and occasions the most crying need for the ophthalmic expert.

It will naturally be objected that no reasonable amount of labor will suffice for such examinations as I advocate—they cost too much time of both scholar and examiner. I have elsewhere shown that such an investigation of the eyes and ears as seems to me requisite, if not indeed adequate, to inform us of the condition of these organs of our school children, costs an average of five minutes apiece, since from twelve to twenty per hour can be studied and recorded by an expert examiner, unaided—while efficient help can double the number. A dozen hours a week devoted to this work instead of to the dispensary or hospital service to which most oculists devote that much time, would suffice for examining with a thoroughness as great as many men use in their private practice, from one hundred and fifty to two hundred pupils; so that in the months before and after opening of the schools, 1,000 would be readily studied. As the conveniences for the examination can generally be arranged at the school, the loss of time to the scholars ought to be unimportant. The entire study can be made by artificial light, as I have preferred to do, except for the color tests; and it may suit all concerned to work outside of the school hours.

There are men in most communities, capable and willing to make such investigations even without compensation, if invited to do so; while most school boards are able and should be willing to pay an honorarium of, say, $100 for each thousand examinations thus made. The main difficulty really lies in the probability of professional jealousy; for there are many men whose sordid motives seem to compel them to attribute the same to any others who might in any such way come prominently before the public. Let those of us who earnestly desire genuine advance in these matters strive to place and keep this in its proper light; or we may find that no self-respecting men will be willing to undertake such labors, much less to inaugurate them. Absolutely disinterested investigators can often be found, who will undertake the work from their sense of duty to the community; and when these are lacking, there will be found men who will consider the time thus employed fairly repaid by the absolutely legitimate recompense offered. If the report on each case is made only officially to the school authorities, and through them impersonally conveyed to the parents, the opportunity for self-aggrandizement will be largely taken away from any so inclined.

Finally, yet fundamentally, as to the method and aims of the examination. The perfection and safety of the visual function depends upon the acuity of vision, the accommodative power, the muscle relations and the health of the retina and choroid. Defects of refraction come in as causes of disturbance of each and all of these, just as do questions of school and home tasks, prints, illumination, seating, ventilation, etc. Perfect function is compatible with marked refraction errors, if the physique be good and the eyes not greatly abused, as witness the proportion of eyes reported comfortable when defect of refraction is almost universal. Given a notable error of refraction, and the margin of safety is surely lessened, if not overstepped; and functional disturbance, if not positive damage is likely to result even under conditions more ideal than are likely to surround our school children. Hence the importance of detecting the defects of refraction present, as well as the mere sharpness of vision for far and near; since good vision and comfort can hardly be maintained under the handicap of ametropia. How small a defect is noteworthy, depends largely on the general vigor of the individual and the health of the interior of the eye. This last can be decided only by the ophthalmoscope, which in expert hands can at the same time give us the surest ready estimate of the refraction and its errors. Minute record should be made and preserved of all these details for future comparison; but it is better to simplify the report made to the school authorities for transmission to the parents, merely stating the vision, any notable error of refraction and any need of prompt medical attention. The fuller technical record, however, should state the date, school and class; the name, age and sex; the general and ocular health; the visual sharpness, muscle relations and choice of astigmatic lines at a distance for each eye separately; the nearest point of distinct vision, the muscle balance and color sense of each near by; the refraction as measured by ophthalmoscope, retinoscopy and, perhaps, the test lenses, with the condition of the eye grounds. To this I have added the record of the inspection of the drumheads, the anterior nares and the pharynx, and of the tests of hearing for whisper and conversational voice and for the tuning-forks by air- and bone-conduction in Weber's and Rinne's tests. An examiner who has practiced independence of tongue depressors and aural and nasal specula, can usually dispense with them in these studies; and while posterior rhinoscopy would be a most valuable aid, it has been omitted, since such introduction of instruments as it necessitates is often alarming to the ignorant or nervous, and might easily awaken serious opposition.

These determinations and records can be satisfactorily made by an expert examiner in from four to six minutes for each pupil, and with good assistance in about three. Each detail can be fairly reliable in

itself and also serve as a check upon the rest; and the results, while not unimpeachable, ought to give us a true estimate of the present condition and future prospects of each eye and ear in the school, such as has all too rarely been even attempted in school investigations. Couple with this a record of the needed anthropometric data of height, body and limb girth, leg and thigh length, elbow height when seated and the condition of the spine; and we may be said to know the physical condition of each scholar, so far as is needful for the safeguarding of the organs of sight and hearing. With these data in the hands of the school authorities and the parents, perversity alone should prevent the application of preventive medicine to those individuals most in need of it.

THE PROPER RELATIONS BETWEEN NATIONAL, STATE AND MUNICIPAL QUARANTINES.

Read in the Section on State Medicine at the Forty-sixth Annual Meeting of the American Medical Association, held at Baltimore, Md., May 7–10, 1895.

BY JEROME COCHRAN, M.D.

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I think it must be evident that the machinery of quarantine administration best adapted to the needs of any particular country has to be determined by the political organization and commercial institutions of such country. It is hence easy to understand that a system of quarantine that might be best for England or France, or for China or Hindoostan, might not be best for the United States or for the State of Alabama.

Our system of government is very complex. We have the federal government for the management of foreign affairs and the commerce between the States. We have the State government, with large powers, for the regulation of internal and domestic affairs and the conservation of the lives, the liberties and the property of the people. Within the State, and deriving their powers from the State, we have the counties and the municipalities invested with important jurisdictions and extending the principles of home rule to the utmost practicable limits. In view of these statements it would seem to be a plausible contention that all these concurrent and coöperative governmental bodies should concur and coöperate in the management of quarantines for the protection of the people against the introduction and dissemination of migrating pestilences, just as they might all concur and coöperate to oppose the invasion and subsequent progress of an army with banners.

Here it becomes necessary to inquire what is meant by the word quarantine, in the phraseology of the question under discussion, because there are practically several different kinds of quarantine.

1. There is maritime quarantine, or quarantine to oppose the importation of epidemic diseases by way of the sea from foreign countries.

2. There is inter-State quarantine to oppose the spread of epidemic diseases from one State into another State, by way of rivers and railroads, and other means of communication between the States.

3. There is intra-State quarantine, or quarantine to oppose the spread of epidemic diseases from one part of a State to another part of the same State, by the ordinary avenues of traffic and travel.

4. There is municipal or local quarantine, or quarantine involving the management of epidemic diseases in a city or a country community, so as to limit the local spread of such diseases and lessen their disastrous consequences.

These statements open the way for the examination of the question of national quarantine jurisdiction, both in its legal and in its practical relations. Has Congress the right to establish and conduct quarantines? And if so, what sort of quarantines? Maritime quarantine? Inter-State quarantine? Intra-State quarantine? Municipal quarantine? No power to legislate in regard to any sort of quarantine is expressly given in the Constitution, and if such power exists it must be involved in the power to regulate commerce with foreign nations and between the States; and under this section of the Constitution, Congress would have to confine its legislative action to the regulation of maritime and inter-State quarantine. It manifestly could not legislate for the regulation of intra-State and municipal quarantine.

The Supreme Court of the United States has never had occasion to decide any case in which this question of the quarantine power of the general government was directly at issue, and consequently the ultimate issue in regard to it is unsettled and uncertain, and we are left without other guidance than the opinion of legal experts, and among these there is a wide difference of opinion. But not even the most thorough-going advocate of the supremacy of the federal power would go further than I have gone in the statement just made, to the effect that the quarantine powers of Congress can not go beyond the regulation of foreign and inter-State quarantine.

In the meantime, without waiting for the judicial settlement of these constitutional questions, Congress has from time to time enacted quarantine and health laws which have played a large part in the recent sanitary history of the country.

In 1879, the National Board of Health was established, with no power to inaugurate or to control quarantines, but with power to act in coöperation with State and local health boards and to afford them financial assistance. To this end the National Board was intrusted with the administration of a large epidemic fund.

A few years later this board fell into bad repute and the distribution of the epidemic fund was placed in the hands of the Marine-Hospital Service, and it was provided that it should still be used in coöperation with the health authorities of the States.

In 1890 Congress passed a very important act for the regulation of inter-State quarantine under the supervision of the Marine-Hospital Service. This act provides that whenever it shall be made to appear to the satisfaction of the President, that cholera, yellow fever, smallpox or plague exists in any State or territory, and that there is danger of the spread of such disease into any other State or territory, he is authorized to cause the Secretary of the Treasury to promulgate such regulations as may, in his judgment, be considered necessary to prevent such spread—such rules to be prepared by the Supervising Surgeon-General of the Marine-Hospital Service.

Again, in 1893, under the stimulus of the big panic caused by the widespread prevalence of cholera in Europe, Congress passed another act giving very large additional quarantine powers to the Marine-Hospital Service. Of this act, the following is the most significant section:

SEC. 3.—That the Supervising Surgeon-General of the

Marine-Hospital Service shall, immediately after this act takes effect, examine the quarantine regulations of all State and municipal boards of health, and shall, under the direction of the Secretary of the Treasury, coöperate with and aid State and municipal boards of health in the execution and enforcement of the rules and regulations of such boards and in the execution and enforcement of the rules and regulations made by the Secretary of the Treasury to prevent the introduction of contagious or infectious diseases into the United States from foreign countries, and into one State or Territory or the District of Columbia from another State or Territory or the District of Columbia; and all rules and regulations made by the Secretary of the Treasury shall operate uniformly and in no manner discriminate against any port or place; and at such ports and places within the United States as have no quarantine regulations under State or municipal authority, where such regulations are, in the opinion of the Secretary of the Treasury, necessary to prevent the introduction of contagious or infectious diseases into the United States from foreign countries, or into one State or Territory or the District of Columbia from another State or Territory or the District of Columbia, and at such ports and places within the United States where quarantine regulations exist under the authority of the State or municipality which, in the opinion of the Secretary of the Treasury, are not sufficient to prevent the introduction of such diseases in the United States, or into one State or Territory or the District of Columbia from another State or Territory or the District of Columbia, the Secretary of the Treasury shall, if in his judgment it is necessary and proper, make such additional rules and regulations as are necessary to prevent the introduction of such diseases into the United States from foreign countries, or into one State or Territory or the District of Columbia from another State or Territory or the District of Columbia, and when said rules and regulations have been made they shall be promulgated by the Secretary of the Treasury and enforced by the sanitary authorities of the States and municipalities, where the State or municipal health authorities will undertake to execute and enforce them; but if the State or municipal authorities shall fail or refuse to enforce said rules and regulations the President shall execute and enforce the same and adopt such measures as in his judgment shall be necessary to prevent the introduction or spread of such diseases, and may detail or appoint officers for that purpose. The Secretary of the Treasury shall make such rules and regulations as are necessary to be observed by vessels at the port of departure and on the voyage, where such vessels sail from any foreign port or place in the United States, to secure the best sanitary condition of such vessel, her cargo, passengers and crew; which shall be published and communicated to and enforced by the consular officers of the United States. None of the penalties herein imposed shall attach to any vessel or owner or officer thereof until a copy of this act, with the rules and regulations made in pursuance thereof, has been posted up in the office of the consul or other consular officer of the United States for ten days, in the port from which said vessel sailed; and the certificate of such consul or consular officer over his official signature shall be competent evidence of such posting in any court of the United States."

It will be observed that the first of these two recent acts relates to inter-State quarantine exclusively, while the second act provides for both inter-State and maritime quarantine. In both, provision is made for the recognition of local quarantines; provided said local quarantines are conducted under regulations satisfactory to the Secretary of the Treasury, or to the Supervising Surgeon-General of the Marine-Hospital Service which is practically the same thing. Of course, with that power, the Surgeon-General will have it all his own way.

But does this high officer know any more than the rest of us how quarantines ought to be conducted? If so, where did he get his expert knowledge? There is only one way for anybody to get expert knowledge of quarantine, and that is by practical quarantine experience. Some of the medical officers of this Service have seen some yellow fever, and a few of them have seen a good deal of yellow fever; while a few of them have had some experience in quarantine work. But if any of them have acquired any large amount of expert knowledge either of yellow fever or of quarantine no proof of it has been vouchsafed to the outside world.

It seems to be taken for granted, by a great many persons, that a quarantine conducted under federal authority will be safer and more to be depended upon than quarantine conducted by local health authorities. But to my mind this is a very questionable proposition, and it certainly finds no warrant in our recent quarantine history. They always have plenty of money to spend—these national quarantine officers—and they know how to spend it admirably well. A rapid historical sketch of what they have done in the way of quarantine work up to this time is not without a certain measure of interest.

In 1879 the National Board of Health appropriated $50,000 to the Tennessee State Board of Health to prevent the extension of yellow fever from the city of Memphis, where it was then prevalent to the rest of the State. They appropriated, also, at the same time $12,000 to the Mississippi State Board of Health, and $8,000 to the Alabama State Board of Health for the protection of their respective States. The fever did not spread in Tennessee or in Mississippi, both of which took the money. Neither did it spread in Alabama which did not take the money; and I undertake to say, as a quarantine expert, that so far as the prevention of the spread of the fever was concerned the $62,000 so expended was very nearly thrown away.

A few years later, the Marine-Hospital Service and the State of Texas together expended the monstrous sum of $100,000 to fence up yellow fever in the town of Brownsville on the Rio Grande, opposite the Mexican town of Matamoras. This, in my judgment, was a wanton waste of money. There might have been good reason for spending $5,000, but hardly for more.

In 1883, the Marine-Hospital Service had charge of the Pensacola quarantine, or at any rate it was in charge of a medical officer of that Service. That year yellow fever got through the quarantine into Pensacola and into the Navy Yard near Pensacola. The Marine-Hospital Service proceeded to put a cordon around the Navy Yard for the protection of the rest of the country, but left Pensacola to scatter the disease over the adjacent portions of Florida and Alabama, as, for example, to Millview, Oakfield, Brewton and Daphne.

In 1887–88, yellow fever spread widely over the State of Florida, and the Marine-Hospital Service was appealed to for help, and responded in its usual energetic and lavish fashion. So far as the State of Florida was concerned, the effort to prevent the dissemination of the fever does not seem to have borne much fruit. Some protection was probably afforded to the State of Georgia. What the cost of this enterprise was to the government I was never able to find out; but it must have been very great. One item I remember—the expenditure of $60,000 in the absurd and utterly useless work of the post-epidemic disinfection of the city of Jacksonville.

In 1893, at Brunswick, Ga., a case of yellow fever got through the quarantine and died at a logging camp somewhere near that city. Whereupon the Marine-Hospital Service declared the Brunswick quarantine to be inefficient and pushed the local authorities aside, and took charge themselves. The experiment was an unfortunate one. In a short time thereafter, yellow fever broke out in the city, the first

case so far as known occurring in the person of Surgeon Brannan, whom they had made quarantine officer. The next thing the Marine-Hospital Service did was to invade the territory of the sovereign State of Georgia and take possession of Brunswick under the plea of inter-State quarantine, and with the cordon and the camp of detention undertook to confine the epidemic to the stricken city. Yellow fever spread to Jessup before the cordon was drawn around Brunswick. But why was not Jessup also subjected to the potent coercion of the cordon? If the cordon prevented the spread of yellow fever from Brunswick, what prevented its spread from Jessup?

I have given this brief sketch of the history of the quarantine achievements of the general government, with the object in view of calling special attention to what I regard as a very serious menace to the authority and usefulness of our State health authorities—to the danger, namely, that all the quarantine functions which naturally belong to the State health authorities may be absorbed and monopolized by the Marine-Hospital Service, or by some other agency of the federal government. A few of the large cities like New York, or New Orleans, or Boston, will resist the innovation for a long time, but there is danger that smaller ports will yield speedily, and that the large ones will finally also give way.

Some plausible reasons may be urged in favor of national sea quarantine. Quarantine is an incident of commerce, and it would seem to be the natural solution of the problem that the power which regulates commerce should also regulate quarantine. The great objection to this solution of the problem of sea quarantine is that it involves a central bureaucratic administration that is necessarily expensive, necessarily arbitrary, and necessarily based on insufficient knowledge of local circumstances and conditions. It would not be difficult to frame a quarantine system in which, by the thorough-going coöperation of national and State authorities, most of these objections could be obviated.

There are just three places in which to oppose the dissemination of migrating pestilences in connection with the transportation of passengers, immigrants, and merchandise. The first of these is at the port of departure in the foreign country. The second is at the port of arrival in this country. The third is at the place of destination in the interior of the country, at the end of the journey. The quarantine of the foreign port, including the inspection and disinfection of ships, passengers, immigrants, and merchandise, and a general system of bills of health and cable notification when anything is wrong—all these things should be in charge of officers of the national government. And there should be at suitable places along our sea coast, refuge stations for dealing with infected ships, crews, passengers and cargoes; and these refuge stations should also be under national control.

Inside of the refuge stations, there should be an inner line of defenses in the shape of local inspection stations at our various seaports; and these should be in the hands of the local or State officers.

Then, from time to time, when in spite of all these defenses some epidemic pestilence gets into the country, we will need to institute land quarantines, railroad quarantines, local quarantines according to circumstances; and these should be under the control of the State and local authorities. If the pestilence swells beyond the power of control at the command of the State and local authorities, then the national government should come to their assistance, not to push them aside as was done in Brunswick, but in the way of supplement and coöperation.

This is in outline the theory of our present quarantine system—the system that has been developed during the last twenty years. I can imagine no better system if it is carried out in its real spirit and purpose. But it now stands in danger of being marred and outraged by the encroachments of the Marine-Hospital Service under the acts of 1890 and 1893—said Service not being satisfied with the control at foreign ports and on the high seas and at the refuge stations, but seeking also the control of the inspection stations and of internal quarantines.

TUBERCULOSIS AND ITS PREVENTION.

Read in the Section on State Medicine, at the Forty-sixth Annual Meeting of the American Medical Association, at Baltimore, Md., May 7-10, 1895.

BY CHARLES E. WINSLOW, M.D.
LOS ANGELES, CAL.

Living, as I have, for the past few years, in a region of the Rockies, where hundreds of consumptives annually come to breathe the pure invigorating atmosphere, hoping to regain lost health and wasted strength, my mind has constantly turned toward the peril to our inhabitants of contagion from these invalids. Although in our high altitude the risk is greatly diminished, still "how to prevent the danger" has been an ever recurring question, and when your chairman kindly invited me to prepare a paper on "Preventive Medicine," my thoughts naturally turned to this subject.

With no space for argument in favor of statistics and cases brought forth by advanced thinkers in their researches, I simply accept their conclusions based on their proofs of facts. My ideas may be crude and my theories familiar, still if they stimulate action along the line of duty that is before us, as earnest and intelligent workers for humanity, I shall accomplish my purpose.

For thousands of years, it may be from the time Adam and Eve bade adieu to fair Eden, to battle with sorrow and death, consumption has been the great enemy of mankind. Men of thought and action have for the sake of their fellowmen, stood up and fought, with the best weapons at their command, and failed to conquer this great destroyer. Here and there down the ages have been seen the beacon fires of progress, until in 1892, Koch kindled a blaze that illumined the whole world. Then the clouds of ignorance lifted, giving us a vision of the boundless realms of preventive medicine. While the advance in curative medicine has been wonderful, the strides made in preventive medicine have been miraculous, and yet we are only on the border line of the Land of Promise, and there is still room for discoveries in preventive medicine. An earnest seeker of dauntless courage may achieve brilliant results in this line of work that will add new luster to our glory as physicians, and longer life to humanity. To-day, men are beginning to judge a physician's success by his ability to prevent as well as to cure disease.

The field is broadening. As we gain knowledge we increase in strength. We need men of strong character and keen intellect to fight the battle of life

against disease. Ours is a peculiar warfare, for not only the enemy, but those of our own household must be overcome. I take for granted that most of the men in this Section believe that tuberculosis is transmissible and that it comes from living bacilli. There are some honest doubters to all great truths and this is no exception.

Tuberculosis is by far the most destructive disease of the human race, outnumbering in its death rate, war and pestilence. In the United States every twenty-four hours, 440 human beings die of tubercular disease. While this great ASSOCIATION is in session, over two thousand five hundred men, women and children, through the agency of this king of terrors, will fill consumptives' graves, and homes all over this land will be in mourning for dear ones whose lives have been cut short by a disease that could have been prevented.

To-day, pulmonary tuberculosis is more widely diffused by infection from sputum than by any other means. The sputum, becoming dry and in the form of dust being carried far and wide, is inhaled into the lungs. Wherever it finds good feeding ground it makes a home. Scientific investigation has shown that a patient in advanced pulmonary tuberculosis may give off millions of bacilli in twenty-four hours. Koch found the dust taken from the rooms occupied by consumptives produced infection in two-thirds of his experiments; others have shown that the sputum retained its virulence as long as seven months. If this be true, and the sputum of tubercular patients, teeming with bacilli, is allowed to become dust, to be carried here and there, inhaled by hundreds of people, settling upon fruit and upon water, to be eaten and to be drunk by hundreds more, is it any wonder that phthisis pulmonalis is no respecter of persons but spreads to the high and the low, the rich and the poor, the young and the old, infecting whole communities once healthy? A common way of infection is through the alimentary canal, by the use of milk from tubercular cows, and meat tainted with tubercular germs; while candies, fruits and vegetables exposed for sale, becoming infected by bacilli-laden dust settling upon them, may spread the disease. With examples too numerous to mention, of the spread of the contamination from husband to wife, brother to brother and friend to friend, knowing the consumptive taints the very air we breathe, the food we eat and the water we drink, how can we, members of this great human family, keepers of our brothers, sit idly by and make no effort to save them?

Among intelligent reasoners the belief that it is an inherited disease is fast passing away, until now we rarely hear the statement. Though one does not inherit tubercular disease, he may inherit the predisposition to consumption, and his lungs form good soil in which the seed will thrive. With these facts before us, proved by a great cloud of witnesses, we are enabled to fight the disease on an intelligent basis, first by destroying the vitality of the seed, then by strengthening the soil till the germs find no nutriment. We have no hidden foe to fight, but one whose methods are known. We may have a knowledge of the best way to prevent infection, still, unaided, we can do nothing. We must have an intelligent people roused, until city, State and nation are compelled to adopt stringent measures for the protection of its inhabitants from this direful disease. When public opinion is educated to the full realization of the danger, and awakened government enforces the laws, we can stamp out this greatest enemy of mankind, or, at least, so control it that it will cease to be a scourge to humanity.

Sanitation and disinfection have given preventive medicine a prominent place among the sciences. To-day it comes nearer giving specific treatment for this class of diseases than does curative medicine. It not only prevents disease in the present generation but it affects posterity. In this age of enlightenment, disease is no longer considered a visitation of Providence but a punishment for neglected laws of health. The people should be made to understand this, and the physician's duty is to instill into their minds the rules of good health, enabling them to save millions of lives. He must show them that although this plague of plagues causes more deaths than all other epidemic diseases combined, still it can be controlled. He should instruct them in their daily intercourse, and teach them through the great molders of public opinion, the press. He should encourage the forming of societies of hygiene, until every hamlet and city in our great nation has an organization for the promotion of life and health. Rouse the women of the land to organize another crusade, for the protection of the homes from sickness and death. One that will sweep across our beloved land, leaving peace and long life to the inhabitants. Seize every opportunity to spread the doctrines of good health. Make the way so plain that the simple can understand. We may be called alarmists, so was Paul Revere. Among our own number will be those who have no faith in things new; even Christ had his doubting Thomas. Others will ignorantly scoff at our danger signals; so did the ancient people at Noah's warning of the flood. A few medical men, with hearts like Nero, will overlook any danger to others, so long as they reap a harvest. As conscientious physicians, champions in the cause of public health, let us do our whole duty, heeding neither indifference, ridicule nor censure. To-day's work will add to the public health, wealth and happiness, and will directly influence the shaping of the course of preventive medicine in coming ages.

A reasonable limitation should be placed upon all tubercular patients. Isolation would be an added burden to the invalid, but strict sanitation is necessary. Carnot proved beyond a doubt that when his patients strictly followed orders in disinfecting their sputum, the dust from their rooms was free from contagion. A thorough system of disinfection should be used in our hotels, theaters, school houses and other public buildings. All receptacles of sputum should contain solutions that will destroy the life of the germs, or keep them moist until life can be destroyed. All cars, steamships and other public conveyances, should be provided with the means for destroying the bacilli, and should be thoroughly disinfected at the end of each trip. Owners of factories and workshops should be compelled to surround their employes with such safeguards as disinfectants and pure air. Rented houses should be fumigated and a certificate from the proper health officer furnished the new tenants. Rooms, bedding and furniture known to have been occupied by a consumptive should be disinfected as soon as vacated. Make the sale of milk and meat from tubercular cattle a crime, and the punishment so severe that men in the business will scan well what leaves the dairy or shop.

Instruct the tubercular mother not to nurse her child. Enforce laws that will restrict immigration, excluding those who suffer with the dread disease. This should be under the supervision of medical experts.

To get at the root of the whole matter—educate the children. Place books in the schools that teach true sanitation, making it the most important study, instead of the least. Develop our youths by physical training so that their constitutions will throw off the seeds of disease instead of retaining them. Teach them that inherited defective organisms must be remedied, that a depleted system will be in condition to receive the germs of phthisis pulmonalis. If principles of sanitation are thoroughly instilled into the minds of our youth, the coming generation will be better able to overcome the dread disease than has been the present one.

Reading material on this subject should be furnished by our boards of health for free distribution. There should be special hospitals for consumptives. All this can not be carried out unless aided by the State and nation. A few of the States have taken a step in the right direction. There should be experimental stations with scientific men in charge, aided by the Government. No such encouragement as Pasteur and Koch received from France and Germany, in the way of funds and laboratories, has been given to the men of our country by the government. Must America in shame always follow, instead of taking her place in the front ranks of medical progress? If there are doubts in regard to advanced theories of health, it is the duty of our government to remove these doubts, or prove the theories false by experiment and research. She can not longer shift the responsibility. If, through mismanagement of railways and factories, a man is accidentally injured or killed, large damages are awarded and the utterance of public opinion is long and loud on account of criminal carelessness. Shall our nation be held guiltless for sickness and death, which she can, but will not prevent? The cost may be great, but, compared with the number of lives saved, the expense will be trifling. Money is freely spent in almost every other line of research, but there seems to be a prejudice against the passage and enforcement of sanitary laws. Our last Congress refused to pass Representative Barthold's bill to appoint a committee to investigate the cause of the pollution of water supplies, but $40,000 was voted to be used in exterminating the gypsy moth, $15,000 for experiments in irrigation and $885,000 was granted to the Weather Bureau.

We do not criticise the expenditure of these immense sums for the benefit of our country. But is it not outrageous that the lives of our people are considered of so little value? Is the financial condition of our country more important than the health of our nation? Are the agricultural interests to take precedence of the lives of our citizens? With the President's recommendation to Congress of a Public Health Department, we passed another mile stone in the march of preventive medicine. That we may keep abreast of advancing civilization, let us agitate this question before the people, until there sits in the cabinet council one whose watchful eye is ever on the foes of mankind, and his finger on the pulse of the nation, seeking for signs of disease, in order that he may ward off threatened danger. Then, and not until then, shall we see the full realization of our hope; our land freed from tubercular disease.

ISOLATION HOSPITALS FOR CONTAGIOUS DISEASES OTHER THAN SMALLPOX.

Read in the Section on State Medicine at the Forty-sixth Annual Meeting of the American Medical Association at Baltimore, Md., May 7-10, 1895.

BY BENJAMIN LEE, M.D.

SECRETARY OF STATE BOARD OF HEALTH OF PENNSYLVANIA, PHILADELPHIA.

It is well known to many members of this Section that the various State boards of health throughout the United States and Canada have been in the habit for many years of meeting annually in conference, each board sending one or more delegates. The object of this conference has been to compare notes with regard to sanitary administration, to render the experience of all the boards available for the information and instruction of each, and to discuss such questions with regard to inter-State and seaboard quarantine, and the mutual relations of the several boards, as have a wider scope than the interests of the individual commonwealths.

At the meeting of this conference, held in Cincinnati in 1888, the question of isolation hospitals was presented in an admirable paper by Dr. P. H. Bryce, Secretary of the Board of Health of the Province of Ontario. The title of his paper was, "The Duty of the Conference in urging the Erection of Isolation Hospitals for the treatment of Infectious Diseases (as scarlatina, diphtheria, etc., as well as smallpox) as a more economical and effective method than placarding and quarantining the houses where these diseases are present." This title appears to me to bring the subject before us in a very practical way. It is, in point of fact, essential that we should have isolation hospitals if we are to protect our communities from the ravages of the two affections mentioned, scarlatina and diphtheria, and to save the thousands of lives of little children which are sacrificed to them every year.

The only question is as to the form in which such hospitals shall be provided. Shall each house in which a case of one of these diseases occurs be made, for the time being, an isolation hospital, its inmates debarred from communication with the outer world, and subjected themselves to the risk of acquiring the disease for the entire period during which the patient is ill, with the added period of necessary quarantine after the patient has ceased to be an object of danger and the house has undergone disinfection? No one whose house has not thus been temporarily converted into an isolation hospital can appreciate the excessive annoyance, discomfort and loss which are thus entailed. Especially is this true with regard to those in moderate circumstances, such as mechanics or small tradesmen, to whom every day of loss of wages, or of business, is a matter of the most serious import. Experience in England, in New York and to a certain extent, in Philadelphia has amply demonstrated that the spread of these diseases in families is very much greater when the home is converted into an isolation hospital than when the member of the family first attacked is removed to a properly arranged and fully equipped isolation hospital. It need scarcely be said that no general hospital is now willing to receive infectious diseases, so that this first plan of converting homes into isolation hospitals must be continued, or other isolation hospitals must be provided.

The alternative plan is, therefore, to establish, not only in every city but also throughout the rural districts, hospitals to which those suffering from con-

tagious diseases, of whatever kind, may be properly removed as soon as the diagnosis is made. In a city of the large population and immense area of Philadelphia, for instance, one such hospital is not sufficient. There should be at least four, so arranged as to be comparatively easy of access from the different quarters of the city. These hospitals should not be magnificent structures several stories in height with elaborate architectural adornment, but should be constructed of wood, on what is known as the pavilion plan, and but one story in height. All of the expenditure should be devoted to the internal arrangement and equipment. In consequence of the horror which is inspired by smallpox, it would unquestionably be better that that disease should be treated in an entirely distinct hospital, and at a different location from the others. The other two should be treated in separate pavilions, but might be under a a common administration. Separate ambulances should also be provided for the different diseases.

The advantage to the family in which such disease occurs can not be overestimated. At the time of the removal of the patient, the house can be inspected and disinfected, and the family, while not quarantined, can be kept under observation till the period of incubation is passed, and the wage earners, after a thorough first disinfection, be allowed to attend to their daily duties. In this way the interference with attendance of children on school will be very greatly diminished. The plan is in the highest sense both humanitarian and economical. As remarked by Dr. Bryce: "It is, in many instances, absolutely impossible for the mother of a large family to nurse, for instance, a case of diphtheria, and attend to the many other household duties. It is indeed cruel to permit a poor family to be, with an almost certainty, afflicted in all its susceptible members with a disease so fatal, and it is unjust and absurd to expect a wage earner to be prevented from earning the necessaries of life, while, with almost absolute certainty, house quarantine will extend the area and period of sickness, inflicting as well as an unnecessarily large doctor's bill, a tolerably certain undertaker's bill in addition."

The paper by Dr. Bryce was generally discussed and his suggestions met with universal approval, so far as the desirability of the step proposed was concerned, the only question being with regard to its practicability in small towns and sparsely settled districts. The subject was referred to a committee which reported as follows:

"1. That the principle of the establishment of isolation hospitals, as a preferable method to placarding houses and quarantining families, has been fully confirmed, both by general experience and the experience of members of the conference.

"2. That the practical difficulties: 1, of expense of establishment; 2, of the removal of persons suffering from dangerous infectious diseases thereto are not so serious in practice as at first sight would appear, since the simple character of the isolated building required in many cases for handling first cases, and the discrimination which ought to be exercised by medical health officers in the removal of persons, will be found to largely remove what in many cases appeared insuperable difficulties.

"3. That it is most desirable that the position which all our State and provincial boards should take, is that of urging from the standpoints of duty and economy, their local boards to establish places of isolation for those cases of diphtheria, etc., which in their opinion will be dangerous to the household and to the community.

"4. That contemporaneously with education along the above lines, State and provincial boards ought to press for such legislation as will place them and their local boards in a position to enforce such isolation as the circumstances may demand."

There is no question in my own mind that the existence of such hospitals, provided with every means which modern science can suggest for the proper treatment of such cases, not only comfortably but tastefully furnished, would be at once appreciated by the community, and that families in good circumstances would be anxious to avail themselves of such opportunities, and to pay well for the privilege, so that such establishments would not only pay for themselves but might be a profitable investment. The mother of the family or the elder sister could go with the patient, so that a little child would not be compelled to suffer the pangs of bereavement, and the home would thus cease to be an isolation hospital, with a placard on the front door stating the fact. As soon as proper disinfection had been performed, the father of the family could go out to business as usual, and the social life of the house could proceed without interruption.

All the discomforts, anxieties, vexation and perplexities accompanying the presence of a case of infectious disease in the house would thus be avoided. Not only would it be a means of protection to the other members of the family, but the chances for the patient himself would be greatly improved. I say this advisedly, and desire to give my reason for this belief. During the past year smallpox has prevailed in Harrisburg, the capital of Pennsylvania. At the earnest solicitation of the Secretary of the State Board of Health, the city council of Harrisburg erected a small isolation hospital, and after that building was in readiness to receive occupants every case was at once removed to it. Extreme care had been taken in the ventilation of the wards of the building. All the used-up and infected air of the building was drawn out by means of artificial exhaustion, and passed through a furnace designed for the destruction of the excreta and garbage of the institution. Warm fresh air was constantly introduced. The amount of fresh air thus furnished was greatly in excess of that with which the patients were provided in their own homes. The consequence was, as I have been assured by the chairman of the sanitary committee, who had the general charge and management of the epidemic, that soon after admission the temperature of the patients fell, the nervous irritability diminished, and as a rule they soon fell into a quiet sleep; in cases in which wild delirium had been present on entering, they awoke from this slumber refreshed and calm. The experience of Harrisburg in this matter is valuable as regards the necessary expense of such a building. Their hospital will accommodate with ease forty patients; it is one story high, seventy-six feet in length and thirty-six in width. Its ventilation, as I have said, is very perfect, and its cremation furnace is so effective that not a particle, either of infected material or of infected air can possibly escape from the building. I believe that it could with safety be placed in a populous neighborhood. The entire cost was only $3,000.

Whether pay patients should be received in separate wards, separate pavilions or in entirely distinct establishments from charity cases is a mere question of detail. It might be quite possible to have distinct wards or distinct pavilions in the

same inclosure for such cases, as is now the custom in general hospitals. But, as one great object would be to make such refuges so attractive that compulsory removal would be unnecessary, it might be well to have entirely separate institutions. If this latter plan were adopted, however, it should be a *sine qua non* that the hospital should be under the direct supervision of the local health authorities, and that every detail of administration should be in accordance with their regulations. In this way alone could safety to the community be insured. This need not interfere, however, with the attendance of the family physician on his own case in the hospital. This would be essential to making the movement a popular one, and would go very far toward recommending it to the patient and his family. The relief to the physician himself from the anxiety which he always feels with regard to other members of the family would be very great. At the same time the facilities which would be provided him for the protection and disinfection of his own clothing and person would be such that he would be much less apprehensive of carrying the infection to other families. The methods of personal precaution insisted on in such a hospital, under the immediate supervision of the health authorities, would also be of very considerable educational value to the profession.

1532 Pine Street.

ADVANTAGES TO A COMMUNITY OF A HOSPITAL FOR CONTAGIOUS DISEASES.

Read in the Section on State Medicine, at the Forty-sixth Annual Meeting of the American Medical Association, at Baltimore, Md., May 7-10, 1895.

BY J. L. LEAL, A.M., M.D.

PATERSON, N. J.

Having had occasion recently to secure some information upon the subject of contagious disease hospitals, I communicated with the authorities of a large number of cities in this country, inquiring what facilities they possessed for the care and isolation of their cases of communicable disease. These inquiries were addressed to cities of the largest size as well as to those of not more than 25,000 inhabitants. The result, considering the advanced state of sanitary science, as well as the general interest regarding the public health which is now aroused, was most astonishing. I found very few cities making any claim to proper equipment for the handling of these diseases. The majority of them possess some sort of a pest house in which a stray case of smallpox, typhus or yellow fever, or cholera could be thrust and hidden away; but do not make the slightest provision for the care of those suffering from the ordinary endemic diseases of this class, or for the protection of the public from such sufferers. A certain small proportion of these cities possess, or contain, general hospitals which have wards or detached pavilions for the care of these cases, but in all of them the facilities are not adequate for the purpose; said wards or pavilions being used mostly for those unfortunates literally thrown upon the care of the city, or of the hospital, and for whom some provision had to be made. Charity and humanity are the ends in view and not the protection of the public health.

Now, in considering the condition of affairs here shown we must conclude, either that the advantages of contagious disease hospitals are not thoroughly appreciated by the health authorities of the majority of these cities, or else that public opinion is not yet educated to the point of granting their demands for this most necessary sanitary equipment. The fault lies probably with the public, and the remedy will prove to be its further education in its needs in this direction. This education and enlightenment will come through the influence of such bodies as this, and the individual efforts of the men who compose them. It is comparatively a few years ago when general hospitals were rare outside of large cities. Now, a town of from five thousand to ten thousand inhabitants without its hospital is a rarity. The public appreciates their necessity and prides itself on their maintenance. They are local monuments to charity and humanity. The contagious disease hospital, on the other hand, is a bulwark against disease, a protection to every citizen, his family and his home. So, as selfishness is ingrained in mankind, and self-preservation is the first law of nature, it but needs the necessary intelligence and knowledge on the part of the citizen to place the contagious disease hospital upon a level of importance at least equal to the police station or the fire engine house.

Now, as to the character of such an institution. It should be a hospital in every sense of the word, and not a pest house. The pest house has outlived its usefulness and should be relegated to the past. Its location should be carefully selected both with reference to the safety of the community from contagion and with reference to the moral effect upon the patients and the community. It should be constructed and managed upon the most modern and scientific principles. The various buildings and departments should be so located and constructed as to secure the safety of patients suffering from one disease, from all danger of infection by another. Furniture should be simple, and floor walls and ceilings should be of such a character as to permit of thorough flushing and disinfection. Medical attendance, nursing and general management of the institution should receive at least as much attention as in the ordinary first-class general hospital. The advantages to a community of such an institution will easily far more than counterbalance the labor and expense involved. In the first place, it will provide proper care for homeless persons, those taken ill in hotels, boarding-houses and institutions, and such care can be given without danger to the public health. In the second place, with an institution of the above character, it would not be long before public sentiment would be educated to the point that the majority of patients suffering with communicable disease would be willing to go, and their friends to send them, to the hospital. Not only on account of the better care which they would there receive, but also on account of the danger to others due to their proximity, as well as to the pecuniary loss due to the public apprehension and the restrictive measures now in use by most health authorities. It would be then but a step further and the public would demand that these cases be removed, whether willing or not, for the sake of the public good. When that point is reached it seems to me that we will be a long way on the road toward the control and almost practical suppression of this class of diseases.

It has been proved that by prompt removal and isolation of persons suffering with smallpox, typhus,

yellow fever and cholera, communities have been saved from what would certainly have proved epidemics of those diseases. Then why would we not secure practically a like result by similar action in the cases of other diseases of this class? Scarlet fever and diphtheria are far more dangerous to the people of this country than any one of the diseases enumerated above. Why, then, so much excitement and so much exertion over the suppression of smallpox, cholera and typhus, while scarlet fever and diphtheria are always with us, and their presence and their ravages taken as a matter of course? Simply because our familiarity with these diseases has bred contempt. It is well known that the Mexican regards smallpox and the Hindoo cholera, in about the same light that we do scarlet fever and diphtheria. I believe that there is more danger to one of our communities from a case of scarlet fever or diphtheria than there is from a case of smallpox, typhus or cholera, and that at least as active measures should be taken for their suppression. Now almost the first thing done is to remove a case of typhus, cholera or smallpox to a place of some kind to get it away from the community, so that its presence may not be a menace to it. Owing largely to this method of procedure, these diseases have become a comparative rarity in well ordered communities. Certainly, this is strong presumptive evidence that we could secure practically similar results by the same procedure in the case of those more common diseases of the same class. To be sure, these diseases are now endemic with us and there exists such general infection that it would be difficult to overcome it. Still I firmly believe that with a proper institution for the purpose, and the prompt removal thither and proper isolation of the cases, together with the sanitary measures now in common use, that this general infection could be overcome and these diseases controlled practically as well as are the others mentioned. In the third place, from an economic point of view such a hospital would be an advantage to any community. An outbreak of communicable disease in the family of an ordinary working man is usually a very serious matter even in a financial way. There will be the usual extraordinary expenses attending illness of any kind, and beside there is usually loss of work for those members of the family through whom the income is received, due either to the restrictive measures employed by the authorities, or through the fear of employer and fellow-employes. Should the disease spread from one to another of the family, a great deal of time and its rewards will be thus lost, and in many cases the family never recovers from the effects. From being a self-supporting, spending member of the community, the working man is often obliged to call for public aid in his trouble. His community therefore loses not only the aid given him, but also what he should have earned and spent during that time. If, now, there were proper hospital facilities, the first case being at once removed from the premises, the chances are that the disease would not spread to other members of the family, and proper precautions having been taken, there would be no fear on the part of employer and public, and therefore no cessation of revenue and consequent financial difficulties. I am confident that a careful investigation on these lines in any community of size, will show a loss far beyond the expense of maintaining a hospital. We are certainly justified, then, in claiming that a proper hospital, properly used, will furnish patients with better care, will tend to protect the general public from infection, and will save the community financially far more than its cost.

SIMPLE CATARACT EXTRACTION AND SOME THOUGHTS ON PROLAPSUS OF THE IRIS.

Read at the meeting of the Chicago Medical Society, June 5, 1895.

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Since the introduction of Daviel's flap operation for cataract in 1748, numerous methods for the extraction of opaque lenses have been introduced, modified and abandoned. The innovation of antisepsis was followed by the rejection of Graefe's modified linear extraction and the re-introduction of the corneal flap. Most of the leading oculists the world over, now make the corneal incision either within the corneo-scleral margin or at the limbus. The important question which has interested oculists with reference to cataract extraction since 1888 is whether to do the simple extraction or the combined operation. The war has been waged fierce and hot. The literature on the subject is extensive. The annals devote separate chapters to the discussion of the two methods. After these years of probation some authorities who first advocated simple extraction have returned to that first love and do an iridectomy. Foremost among these stands Stellwag von Carion. Such reliable and skilled observers as Knapp, De Wecker, Schweiger, Hirschberg, Noyes, Gruening, Galezowski, Panas, Gayet and others affirm that simple extraction without iridectomy is the ideal cataract operation. Fuchs, Argyl-Robertson, Swanzy and Von Hippel have always advocated the combined method. In order to appreciate what gave rise to these diverse opinions it may be well to learn that the *causus belli* was the danger arising from prolapsus of the iris. The advocates of iridectomy rightly claim that the above mentioned mishap can not occur when a piece of the iris is removed. The upholders of simple extraction, on the other hand, assert that prolapsus of the iris does not frequently follow, and when it does, it is not a serious complication and can be readily overcome in many cases by snipping it off. Again, they maintain that iridectomy exposes the eye to many dangers which simple extraction obviates.

The advantages and disadvantages have been summarized by many writers. I will quote the opinion of a few only. Knapp[1] enumerates the advantages of the simple extraction as follows:

1. It preserves the natural appearance of the eye.
2. The acuteness of the vision, other things being equal, is greater.
3. Eccentric vision and "orientation" (correct localization of objects in the visual field) are much better, adding a great deal to the comfort and safety of the patient.
4. Parts in direct connection with the ciliary body, such as shreds of the capsule and iris, are not so liable to be locked up in the wound, and thus transmit morbid conditions to the most vulnerable part of the eye—the ciliary body.

[1] Annual of Medical Science, Sajous, vol. III., B. p. 51, 1888.

5. It may not necessitate so many after-operations.

As disadvantages, may be mentioned:

1. The technique of the operation is more difficult in all its parts. (*a*), the section must be larger to let the lens pass through an aperture, the size of which is diminished by the iris lying in it; it must be more accurate to secure coaptation, and it must be more rapidly performed in order to prevent the iris from falling before the knife. (*b*), the opening of the capsule requires a deeper introduction of the cystotome into the anterior chamber. (*c*), the expulsion of the lens is more difficult; and (*d*), the cleansing of the pupillary area is much more troublesome than in the combined extraction.

2. Prolapsus of iris and posterior synechiæ are more numerous.

3. It requires a quieter and more manageable patient during and after the operation than is needed in the combined extraction.

4. It is not applicable to all patients; whereas, combined extraction can be used as a general method.

Bull's[2] conclusions and those of Schweigger[3] are very similar to those already referred to. Further observations and experience have demonstrated that they are tenable at the present day. It is not my intention to discuss this subject at all, being fully satisfied that simple extraction in selected cases is, to use the words of Dr. Knapp, "an operation of the highest order." During the last four years I have done the simple extraction exclusively in all cases where no contra-indication existed. In the early part of my experience, I placed the upper part of my corneal section between 1 and 2 mm. within the corneo-scleral margin, completing the incision by turning the knife at right angles to the corneal surface and cutting out vertically. In every case I instilled eserin up to six months ago, to contract the pupil and forestall prolapsus of the iris. In some, adhesions formed between the iris and edge of the corneal wound which, as far as I know, did not cause any subsequent worse results than elongating the pupil. In only four of the cases operated upon up to the present date did a prolapsus of the iris occur. In two only was I obliged to snip it off. The two others disappeared after two or three weeks, leaving a clear corneal scar with adhesion of the iris to the posterior surface of the cornea.

After reading De Wecker's[4] article on "*La Suppression Partielle De l'emploi Des Collyres*," in which he calls attention to the uselessness of eserin in preventing prolapsus of the iris, and to the dangers of sepsis resulting from the employment of eye drops which rarely are germ proof, I abandoned its use. The results became correspondingly better, synechiæ became rare, the great majority of eyes showing perfectly round, regular pupils. I also placed the corneal incision nearer the periphery within the corneo-scleral boundary. These changes in the technique of the operation improved my results. Thus the two imaginary safeguards in avoiding prolapse of the iris were found to be without foundation. I had supposed that the upper corneal flap, if I may so call it, acted as a support to the iris and prevented its incarceration in the corneal wound. During my recent sojourn in New York, I noticed that neither Gruening, Knapp, nor Noyes evidenced any fear of prolapsus of the iris, the former dilating the pupil before and after extraction with a 10 per cent. solution of cocain, the others with atropin. Gruening affirms that the cocain reduces the intra-ocular tension. Accacio da Gama[5] recommended the employment of atropin in simple extraction in 1890. I desire to report tonight my last cataract operations in which the incision was made in the extreme periphery of the cornea and atropin was employed to dilate the pupil before and after the extraction. The results obtained, with one exception, may be regarded as ideal.

Case 1.—John Mueller, aged 57. Mature senile cataract of right eye. Perception and projection good. March 2, atropin instilled into right eye two hours before operation. Incision made in limbus. Lens easily removed. Instillation of atropin; both eyes bandaged. Patient allowed to walk to his room. Bandage removed on third day. Wound healed, pupil round. Bandage removed on each succeeding day and atropin instilled. Left eye remained free after fourth day; right eye after sixth day. Patient out of bed on fourth day. Eyes protected by shade after tenth day.

Case 2.—Mike Walsh, age unknown. Diagnosis: mature senile cataract of right eye. Perception and projection good. Simple extraction March 4. Pupil dilated by atropin. Corneal incision in limbus. Lens readily removed. Atropin instilled, eyes bandaged, patient walked to his room. Two days later bandage taken off and eye found in excellent condition. Pupil round and dilated. Patient out of bed next day, without bandage on sixth day, given liberty of house, protected by shade.

Case 3.—John Sapp, aged 64. Diagnosis: mature senile cataract of left eye. Immature right eye. Perception and projection good. March 9, simple extraction done with left hand. Pupil did not react well to cocain mydriatic. My assistant had forgotten to employ atropin instead. Lens extracted with difficulty through contracted pupil. Edge of iris was slightly nicked by the voluminous lens being forced through pupil. Atropin instilled, eyes bandaged. Recovery uneventful. Pupil round, regular and free. After-treatment the same as in above cases.

Case 4.—John Hobert, age 42. Mature senile cataract left eye. Perception and projection good. Opacities of cornea due to chronic trachoma. March 26, simple extraction with left hand, atropin mydriasis. Bandage changed daily after third day; atropin instilled. Recovery normal. Result perfect.

Case 5.—A. G. Thomas, age 62. Mature senile cataract right eye. Perception and projection good. April 6, pupil under influence of atropin, simple extraction. After-treatment routine one. Result perfect. Patient kept quiet in bed two days; allowed to leave room on seventh day with shade.

Case 6.—Peter McNamee. Mature senile cataract left eye. Perception and projection good. Operation April 19, atropin mydriasis. Simple extraction with left hand. Uneventful recovery. No unpleasant reaction. Routine after-treatment. Perfect result. Pupil round and clear.

Case 7.—A. G. Thomas. Mature senile cataract left eye. May 2, simple extraction; atropin employed before and after operation. After-treatment as in above cases. Result perfect. In lower pupillary field, opaque capsule.

Case 8.—Lydia D., aged 52. Insane epileptic brought from Elgin Insane Asylum. Mature senile cataract left eye. Right eye had been operated one year ago, combined operation with good results. May 11 atropin instilled forty-eight hours before operation. Simple extraction done with left hand. On the second day patient pulled the bandage from the eye. It was re-bandaged by a patient. On dressing the eye May 13, I found a small prolapsus of the iris. The eye was otherwise normal in appearance. The right was exposed, the left re-bandaged every day and atropin instilled. The prolapsus fully disappeared after ten days' bandaging. On June 1 she was discharged. The pupil is oval, the upper part of the iris being incarcerated in the perfectly smooth cicatrix. Her vision is good.

Cases 9 and 10.—John W. F. Mueller, aged 50. Mature cataract both eyes. Lower one-third of left cornea covered by a dense scar. Right pupil dilated by atropin and lens extracted early in March. Simple extraction. Bandage removed two days later. Wound healed, pupil dilated and round. Left eye remained free after third day. Perfect

[2] Bull, Sajous Annual, 1890, B., 62.
[3] Schweigger, Sajous Annual, 1888.
[4] Annales d' Oculistique, June, 1894, p. 401.
[5] Accacio da Gama, Nov. 16, 1890.

recovery; allowed to walk about house at expiration of one week. Left eye operated with left hand May 16. Simple extraction. Result perfect.

Case II.—Mrs. K., aged 62. Right eye, combined operation four years ago. Left eye, senile mature cataract. May 27, after instilling atropin four times during the day, I did a simple extraction with left hand. Bandage removed two days later. Eye slightly injected; wound healed; pupil dilated and regular; small quantity of opaque lens substance in pupillary field. This absorbed in time. Right eye left unbandaged after third day; left eye after seventh. Recovery rapid; result excellent.

In every one of the above cases, a wrinkling of the lens capsule ensued which impaired the vision. In some, I made a secondary capsulotomy which materially improved the vision. The others will be subjected to the same operative procedure within the next few weeks. My experience with atropin in simple cataract extraction is limited to the above cases, and being meager will not permit of any very general deductions. I can not refrain, however, from giving vent to some views regarding the occurrence of prolapsus of the iris and how best to avoid it. It is a well-known fact that this complication is due directly to opening of the corneal wound and indirectly to the escape of the aqueous humor which flushes the iris between the lips of the gaping wound. The pressure exerted by the aqueous in the anterior chamber upon the cornea is naturally the same over its entire posterior surface, but the upper part of this membrane, owing to its severed condition, naturally offers less resistance than its remaining part. If the pupil is contracted by eserin, the appearance of the iris must necessarily be forced out of position by the aqueous humor in the posterior chamber. If the iris were a rigid membrane, the contents of the posterior chamber would flow through the pupil into the anterior chamber and then through the re-opened corneal wound. But as the rainbow membrane is a delicate relaxed tissue, we can readily comprehend that the aqueous humor back of it in flowing out from the eye carries the iris before it, forcing it out of the eye, thus producing a hernia of the iris. Another factor which favors prolapsus is the contractile power of the sclerotic. In the normal eye this tunic is kept comparatively tense by the pressure exerted from within by the aqueous and vitreous humors. When the eye is opened the place formerly occupied by the drained off aqueous, is filled by the other ocular contents, which are propelled forward through a partial collapse or contraction of the sclerotic. If the sclerotic were composed of some firm and unyielding material, as bone, the anterior and posterior chambers might be evacuated without endangering to a great extent the position of the iris, especially if the pupil were dilated. The above mode of reasoning has been fully elucidated by Fuchs in his classical treatise on "Ophthalmology." If this line of argument is conceded to rest on fully established truths, several logical sequences result. Narrowing of the pupil by eserin increases the danger of large prolapsus of the iris, this tissue offering in its contracted state a larger surface for the aqueous back of it to force outward, than if it were widely dilated. In the latter case, a larger quantity of aqueous would find direct outlet through the pupil, and less iris surface act as resisting medium. The only valid reason for employing eserin at all would hold good if its use were based upon its property of reducing intra-ocular tension.

The first thought to present itself to an operator, in trying to avoid prolapsus and still preserve the iris intact, is to make the corneal incision near the pupillary margin. The pressure from behind on the cornea is now more equally divided, or rather the resistance offered the aqueous humor is more uniform, the upper flaps being almost as firm as the lower ones. Such an operation was actually devised by Liebreich. The interference to vision by the subsequent corneal scar, the production of astigmatism, due to irregular curvature of the cornea, and the frequent occurrence of anterior synechia make this method undesirable. Therefore several operators favored a more peripheral incision, one within 1 and 2 mm. of the limbus. This is the cut I have heretofore practiced, as stated before. I still regard it as a desirable procedure. The upper corneal flap is from 1½ to 2 mm. high. It offers a support to the iris and when a prolapsus does occur it can not be as large as when the incision is made in the corneo-scleral margin. Another method of decreasing the chances of prolapsus is that advocated by Galezowski and Fuchs—sphincterotomy. It consists in cutting out a small piece of the pupillary margin of the iris. It is asserted that an easier delivery of the lens is thus permitted and less resistance offered the aqueous in the posterior chamber. The importance given to iris hernia in this paper might lead one to suppose that it is of frequent occurrence. This is not so, as reference to statistics will verify.

Esson reported eight cases of incarceration of the iris in sixty operations.

Albrandt, in a series of 232 operations, done by Scholler, noted prolapsus twenty times.

Knapp,[6] in 509 simple extractions, 42 cases of prolapsus (8.2 per cent.). In the majority of cases it was slight and either disappeared spontaneously or cicatrized without danger to the eye.

E. Greiff[7] reports 450 cases operated by Schweigger, of Berlin, prolapsus thirty-five times (7.9 per cent.); nine were small and required no further attention; twenty-seven (6 per cent.) were amputated. One hundred and thirty cases (corneal incision above), prolapsus twenty-three times = 8.5 per cent.

Knapp[8] in 300 simple extractions met with prolapsus and incarceration of iris eight times. The latest statistics by the same author, presented at the Eighth International Congress, held at Edinburg, August 7 to 11, 1894, show 35 cases (10.3 per cent. of prolapsus, incarceration, or adhesions of the iris in 548 operations.

To what, however, must we attribute the hernia iridis? The location of the corneal section does not appear to have a great bearing, the percentage of prolapse not being materially influenced by either method. During the last four years I have encountered but four cases of prolapsus. One occurred in an excessively nervous patient, who retched and vomited frequently during the twenty-four hours subsequent to the extraction. Two took place in patients who left their bed contrary to orders twelve hours after the operation. The fourth, the one reported above, must be attributed to the violence and unruliness of the insane woman. Two were snipped off, and two disappeared after a week's bandaging. In my opinion, the subsequent treatment and behavior of the patient is largely responsible for it. Bearing in mind that the intra-ocular tension after the extrac-

[6] Transactions of the Amer. Ophthal. Soc., twenty-seventh meeting, p. 80.
[7] Archiv f. Augenheilkunde, XXII, p. 186.
[8] Archiv f. Augenheilkunde, XXII, p. 335.

tion is relatively greater than it was before the cornea was incised, we must endeavor by counter-pressure and immobility of the eye to hasten the re-adhesion and firmness of the corneal wound; in one word, to restore as rapidly as possible the equilibrium between external and internal pressure. Great differences of opinion exist regarding the after-treatment. Chisholm stands at the head of a faction who oppose bandages and restraint of all kinds. He simply fastens the lids of the operated eye by gold-beater's skin or a piece of adhesive plaster, leaves the other eye open and gives the patient, protected only by dark glasses, the freedom of the ward. Others, again, permit the bandaged patient to walk from the operating room to his bed and there remain quietly for two days. Some operators do not remove the first dressing until forty-eight hours elapse; others operate on the patient in bed so as to avoid any possible strain attributed to locomotion and undressing. I heartily agree with the innovators of the idea that patients should be free from the restraint which was formerly placed upon them, but it appears to me some go to the opposite extreme. When I was Professor Becker's assistant in Heidelberg, fifteen years ago, our cataract cases were indeed subjected to a most trying ordeal. During the first four or five days they were expected to lie prone on the back. Notwithstanding the impossibility of the occurrence of prolapsus, owing to the iridectomy done in every case, on the third or fourth day they were allowed to assume a half upright position, being supported by a back rest. At the end of a week one eye was unbandaged and the patient allowed to sit in a chair in a dark room. It required another week to accustom the operated eye to the light, which entered through a partially drawn Venetian blind. During the third week the patient was given the freedom of the hospital, the eye protected by smoked glasses. The middle course, not too much freedom and not too much restraint, I regard more in keeping with the demands of circumstances we are called upon to meet. The upper half of the cornea has been severed. This must re-unite. Any untoward movement of the eye or of the body which will tend to disturb the close adaptation of the flap, either on account of mechanical insult or increase of intra-ocular pressure, must be carefully avoided. This can best be accomplished by guarding the patient from such mishaps.

I do not intend to take up more of your time by entering into a detailed discussion of the various methods of after-treatment, but will, in conclusion, mention the method I invariably enforce. I always operate in the operating room, the patient reclining either in a chair or on an operating table. After extracting the cataract, both eyes are covered by pieces of clean linen dipped in boric acid. Over this are placed two thicknesses of thin cotton discs. The whole is kept in position either by a two inch broad gauze bandage, or more often by one made of starched mosquito bar netting. This latter material must not be starched too much, otherwise it will after drying, exert too much pressure on the eyes. The fine netting in commercial use will answer the purpose. After being sterilized it is dipped in boric acid and applied. The patient is led to his room, and such clothes as have not been previously removed are now taken off. The parting instructions are, "Remain quietly on your back, or on the non-operated side for twelve hours." An aperient having been given the night before, the desire to evacuate the bowels will not arise until the third day. The bandage and wet cloths dry after a few hours and conform to the shape of the head and other parts they cover, thus exercising a uniform and gentle counter-pressure and rendering the eyes immobile. When the bandage is cut away it retains the form of the parts like a plaster-of-Paris dressing. Only fluid diet is allowed the first forty-eight hours. After twelve hours the patient is supported in a partially upright position by a back-rest. The eye is dressed for the first time on the third day unless subjective symptoms require an earlier inspection. After removal of the bandage (cut with scissors), the edges of the lids are washed with boric acid and the eye inspected. Boric acid and atropin are dropped between the lids and the eye re-bandaged. This method of dressing the eye is repeated daily until the fifth day, when the eye is left open, the non-operated eye having been freed already on the third day after the operation. On the third day the patient leaves the bed and sits in a comfortable chair. On the seventh he leaves his room. This is my routine practice in the general run of cases. Strict adherence to the above method, which contemplates rapid union of the corneal wound, by moderate quiet of the patient and immobility of the eyes, appears to me to be responsible for the few cases (four) of prolapsus which have occurred in my practice. The presence of a well trained nurse helps greatly in reaching the desired end.

Permit me, in conclusion, briefly to review the main features of this paper. My object in reporting the eleven cases operated under atropin and with a periphery incision and in referring to other methods in vogue, is to demonstrate that good results are obtained, no matter where the corneal incision is placed; neither does the employment or disuse of eserin, atropin and cocain affect the occurrence of prolapsed iris. The most important factor in an ideal outcome is the after-treatment, the observance of methods which will counteract intra-ocular tension and thus rapidly lead to reunion and firmness of the cornea.

CLINICAL MICROSCOPY.

Read by title before the Tri-State Medical Society at St. Louis, April 2 1895.

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In presenting a paper on the subject of scientific medicine and the microscope, I have no discoveries to reveal, nor shall I attempt to review the progress in the science of medicine brought about through the revelations of the microscope; but rather will I direct your attention to its clinical value. With this in view, we will omit detailed reference to the important facts revealed by studying the minute anatomy of the different organs in both their normal and diseased conditions. It is axiomatic that the more we know of the structure, both macroscopic and microscopic, of organs healthy or diseased, the more capable are we to understand the physiologic and pathologic processes which occur in those organs or tissues; and so we will not dwell on those points. Moreover a large part of such knowledge has been acquired through study of the post-mortem specimen.

But to-day I desire to emphasize the growing im-

portance of the microscope in the clinic, or at the bedside, as an aid and sometimes as the all-essential factor in establishing an early and positive diagnosis and prognosis.

With the recent discoveries in chemistry, microscopy, and bacteriology, scientific medicine has probably advanced as much in the last few decades as in all previous time. The art of medicine is being replaced by the science of medicine. Not more than a generation ago, the successful practitioner must needs have had very extended observation of disease in order to weigh one symptom with another, and judge between them properly. Distinctive pathognomonic symptoms were not known so well as now. Diagnoses were more a matter of judgment, and naturally, other things being equal, the one who guessed the longest was the best guesser.

But at present, with a great many diseases, conditions have changed. Thorough laboratory courses may answer for several years of practice. Instead of looking for a combination of symptoms, we look for one distinctive symptom; and whereas the old practitioner, in many cases, after much observing and deliberation, could give only a probable diagnosis, to-day, the young physician well drilled in chemistry, microscopy and bacteriology is able in many of the same cases to give an immediate and positive diagnosis and a more correct prognosis. The artist is giving way to the scientist, conjecture and judgment to confidence and knowledge.

The diseases which often can be positively diagnosed by a microscopic examination of the blood, and sometimes only by such an examination are: leukemia, pseudo-leukemia, oligo-cythemia, pernicious anemia, simple leucocytosis, chlorosis, anthrax, miliary tuberculosis, glanders, typhoid fever, tetanus, relapsing fever and malaria, with its different tertian, quartan and atypical types; and those diseases caused by the animal parasites: distoma hematobium, and filaria sanguinis hominis.

To review a little, we find that oligo-cythemia is characterized by a decreased number of the red blood corpuscles without change in the number of the white. In health 1 cu. mm. of blood contains according to Vierordt, four to five million red blood corpuscles. In oligo-cythemia, the number has been known to be decreased to 360,000 for the same volume. Probably the best means of determining the number for clinical use in diagnosis and in estimating the effect of therapeutic measures is the microscope, together with the Thoma-Zeiss counting apparatus. The amount of contained hemoglobin can be most accurately determined with Fleischl's hemometer.

The condition oligo-cythemia is present in simple anemia, chlorosis and pernicious anemia. In the simple anemia there is merely a decrease in the number of the red corpuscles with a normal amount of hemoglobin for each corpuscle. In chlorosis there is, beside the decrease in the number of the red corpuscles, also a decreased amount of hemoglobin in each corpuscle. While in pernicious anemia, a disease which is always fatal, there is, beside the lessened number of red blood corpuscles and of their contained hemoglobin, the additional factor of poikilocytosis, *i. e.*, a marked irregularity in their size and shape, with relative increase of the amount of hemoglobin.

Leucocytosis, on the other hand, is a condition characterized by an increase in the number of the blood's white corpuscles, which in health range from four thousand to ten thousand per cu. mm.

A much more serious condition, which is generally fatal, and the diagnosis of which is therefore valuable, mainly for the prognosis, is leukemia, or leucocythemia, characterized by a great increase of the number of the white corpuscles, a decrease of the number of the red and of their relative hemoglobin contents, associated with a marked increase of lymphoid tissue in the body. But pseudo-leukemia or Hodgkin's disease shows the increase of lymphoid tissue but not of the leucocytes.

Of the infectious diseases whose germs are sometimes found in the blood, those of anthrax, relapsing fever, and malaria may be recognized by microscopic examination of fresh blood; but in glanders, typhoid, tetanus and general miliary tuberculosis, cover-glass preparations of the blood must be made and stained before examined.

Given a suspected case of anthrax, anthrax edema, anthrax carbuncle, malignant pustule or woolsorter's disease, as the affection is variously called, an early diagnosis from acute phlegmonous inflammation and malignant edema is important, especially when the seat of origin is in the skin, for an early, and therefore thorough excision of the part may prevent general infection which latter when it occurs is generally fatal.

The diseases likely to be confounded with relapsing fever or its synonyms, bilious typhoid, famine fever, mild yellow fever, seven days fever, bilious relapsing fever, are atypical cases of malaria, sepsis, miliary tuberculosis, etc. But probably in none of the infectious diseases is the exciting cause more readily demonstrated in the blood than is the spirillum Obermeier in the blood of those suffering from relapsing fever. In acute general miliary tuberculosis, always a fatal disease, the diagnosis not infrequently is difficult in the extreme. Typhoid fever, septicemia, pyemia, chronic local tuberculosis of the kidneys, complicated by uremia, non-tubercular meningitis, capillary bronchitis, and general carcinomatous or sarcomatous metastases are all similar in many points. The finding of bacillus tuberculosis in the blood, cover-glass preparations of which are made and stained in the same way as from sputum settles the question, both as to diagnosis and the inevitable prognosis.

The blood of typhoid patients is but rarely found to contain Eberth's bacillus, especially in the early stages of the disease, being found much earlier in the fecal evacuations. However, its demonstration in the blood would speak positively for the diagnosis and indicate a very serious condition of the patient.

Glanders seldom attacks the human species, but when it does the demonstration of the Rotz bacillus or bacillus Mallei is best done by staining the cover-glass preparation according to Löffler's method. When the disease is purely local it may be confounded with syphilis or tuberculosis, but diagnosed and treated properly may be cured; however, when the germs have entered the circulation, a fatal ending is only a question of time.

Tetanus, although not a frequent disease in this climate, yet occasionally appearing as a wound disease, the discovery of the bacillus in the blood bids fair to assume considerable practical importance by reason of the discovery by Tizzoni and Cattani in the blood serum of an immune animal, of the tetanus antitoxin, analogous to Behring's diphtheria antitoxin.

In malarial affections we distinguish three distinct types of the disease: tertian, quartan, and irregular, and each is known to be accompanied by different forms of the plasmodium malariæ.

In the tertian type, which is the most common, the plasmodium or hemamœba malariæ requires two days for the growth of a generation, each attack of chill and fever marking the advent of a new generation and the parent is seen divided into fifteen to twenty segments.

In the quartan type, the parasite requires three days for its complete development and its progeny is six to twelve.

The atypical cases where the paroxysm is quite irregular, or even approaches the type of a remittent or continuous fever, or takes the form designated as chronic malarial poisoning, or malarial cachexia, is characterized most frequently by the half moon or sickle-shaped plasmodium of Laveran.

The pure intermittent quotidian is caused by three generations of the quartan type, each maturing on separate days.

Ordinarily, the pure tertian type, with the attack every other day, offers no great difficulty in diagnosis; but in the atypical forms already mentioned, a positive diagnosis is often long delayed and not infrequently impossible without the aid of the microscope.

From sputum and secretions and excretions of the oral cavity we recognize: parasitic stomatitis, tuberculosis pulmonalis, diphtheria or membranous croup, actinomycosis and croupous pneumonia.

In the examination of sputum for pulmonary tuberculosis, and of tonsillar or faucial exudates for the Klebs-Löffler bacillus of diphtheria, the microscope scores two of its greatest triumphs, the practical value of which is so well known that I shall not here dwell on them.

By examination of fecal discharge we may diagnose: cholera, typhoid fever, intestinal tuberculosis, and various animal parasites causing more or less of acute enteritis and the varieties under the subkingdom vermes as tænia, trichinæ, etc.

In microscopic examination of urine, much positive knowledge is obtained with reference to disease of genito-urinary organs, especially in differential diagnosis between simple hematuria, acute nephritis, chronic nephritis, contracted kidney and amygloid kidney, passive congestion of kidney and nephritic infarcts.

The form of predominating crystals in urinary sediment may reveal the nature of any existing calculi. Not infrequently, different tumors of the urinary tract, as papilloma, epithelioma and sarcoma shed small portions of their substance which are voided in the urine and whose nature can then be revealed best by the microscope.

Tuberculosis of the urinary tract can often be positively diagnosed only by cover-glass preparations of urinary sediments; and the seat of the ulcer, whether in the bladder, ureter or kidney, can often be determined by the predominance in the sediment of certain characteristic forms of epithelium desquamated by the ulcerous process.

Differentiation between a simple non-infective and gonorrheal urethritis is possible in all cases by the proper microscopic and bacteriologic methods, and in some cases where all other methods would fail. Prostatorrhea, spermatorrhea and male sterility are also questions for the microscope to determine.

Finally, the finding in the urine of actinomycosis, ecchinococci, distoma hematobium, filarial sanguinis hominis and ascarides would explain otherwise very puzzling cases.

Of the cutaneous parasites, we recognize tricophyton tonsurans of ringworm, achorion Schoenlinii, of forms of ascoptes hominis of scabies, acarus folliculorum, beside the varities of pediculi.

Then in different varieties of abscess, or purulent exudates, we can often appeal with advantage to the microscope to determine whether it is caused by the common pyogenic germs, or the bacillus tuberculosis or, less frequently, by anthrax, lepra or tetanus bacilli, or by echinococci or actinomycosis.

Another very important field for microscopy is in the recognition and differential diagnosis of benign and malignant tumors, especially in parts suitable for operation; and in many cases, as has so frequently been stated already in this paper, the microscope offers the only means of making a positive diagnosis early enough to allow of effective treatment.

Then in the domain of medical jurisprudence, where facts are demanded and conjecture is not allowed, the microscope plays an important rôle in the recognition of blood, hair, spermatozoa, etc.

In many of the conditions and diseases referred to, diagnosis can often be made with great probability, and even positively, by noting a combination of symptoms and observing the course of the disease, or by excluding the possibility of other diseases in the case. But such methods are always unsatisfactory and often dangerous in their delay. For some one or more of the combination of symptoms may remain absent or be slow in manifesting itself, the patient may die before the course of the disease is run, and diagnosis by simple exclusion is likewise a slow and unsatisfactory method. It is saying what the disease is not, rather than what it is.

But the progress of medicine, as a science, demands and is achieving early and positive diagnoses. The single and distinctive pathognomonic symptom is being sought and found. The essential and exciting cause (without which the disease would not exist, no matter how many predisposing factors were operating) is being recognized, and the way better paved for the train of therapeutic measures to follow.

The hospital, with its clinical and bedside teaching, has always been and always will be essential in proper medical training. Laboratories are becoming so, more and more every day. They are making the clinics more available and practical; and those colleges with limited clinical facilities can not establish themselves as thorough and practical institutions without equipping and maintaining good laboratories, and with such they can become eminently practical and scientific, for they can then, and not till then, use their clinical material to the best advantage.

CONCLUSIONS.

1. Medicine in many points is fast becoming a practical science.

2. Microscopy and other laboratory methods are doing a great deal toward establishing the science of medicine.

3. Thorough drill of the student in laboratory methods may answer for several years of general practice.

4. Positive diagnoses and more correct prognoses are possible in a goodly number of diseases only by

the microscope, and general practitioners not having had thorough training in this instrument of precision should, at least for the benefit of their patients, avail themselves of it, or call on the services of an expert in that line.

5. Medical colleges with limited clinical facilities may make their teaching eminently scientific and practical, by establishing and conducting good laboratories and thus get the best good from their clinics.

PERITONEAL SUPPORTS—(LIGAMENTUM PERITONEI).

BY BYRON ROBINSON.

PROFESSOR OF GYNECOLOGY POST-GRADUATE SCHOOL. CHICAGO.

(*Continued from page 326.*)

In my opinion to Meckel belongs the chief credit of the coalescence theory (1817) and Müller in 1830 simply confirmed his views and enlightened the world as to the origin and development of the great omentum. Yet it is not necessary to believe that even such celebrated men as Meckel and Müller could not make mistakes. I have read with care and pleasure Müller's article on the "Origin of the Great Omentum," written in German in 1830. I find that even Müller could labor under errors. For example, Müller states that the mesogaster ceases at the point where the duodenum begins. Any one can easily disprove this statement by opening a human embryo at six weeks or, still better, a dog or cat, whence in all three cases it will be plain and easy to see that the mesogaster extends all the way down the duodenum to the junction with the ileum. The mesogaster includes the mesentery of the stomach and duodenum. Hence one of Müller's errors is pointed out and corrected. Again, Müller noted that at first the mesogastrium arises in the mid-dorsal line, but with the change of the position of the stomach it becomes shifted toward the left. This is also an error of Müller, for the insertion of the mesogaster is always in the mid-dorsal line. Any one can prove that the mesogaster is always in the mid-dorsal line by opening up an adult cat, when it will be found that the mesogaster has never varied from the mid-dorsal line. In adult man, it appears that the mesogaster is not in the middle line, but that is owing to a displacement of the serous membrane toward the left or, as the coalescence theorists would have it, the left blade of the mesogaster has coalesced with the dorsal parietal peritoneum. Hence, it is plain to observe two errors of Müller. Again he asserts that the coalescence (verklebung) between the anterior blade of the great omentum and the upper blade of the transverse mesocolon can be easily divided in embryos of the third and fourth month. Whether this be an error or not, I will say that I never found this condition of re-dividing or re-separating the coalesced membranes possible in any embryo of any age. Since we have found several palpable errors in Müller's noted essay of 1830, is it not possible that he was in error (and his followers) when he announced the confirmation of Meckel's theory of coalescence of the anterior blade of the great omentum with the upper blade of the transverse mesocolon? It must be admitted, however, that when a very accurate and keen investigator like Toldt of Vienna, lends his voice and pen to aid in supporting the theory of coalescence, it demands prudence and caution in opposing it. Respectful attention to

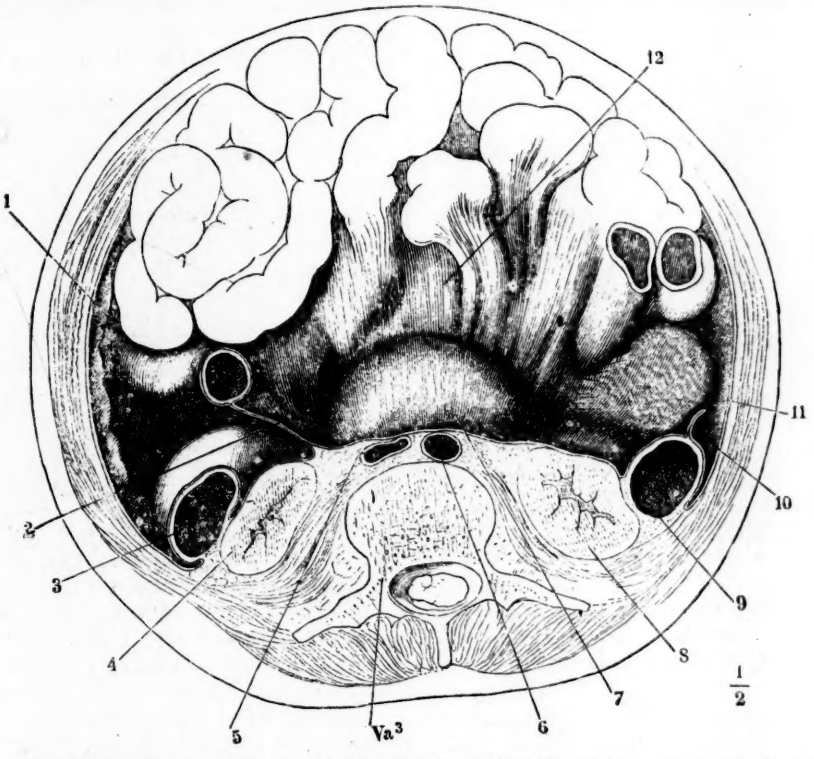

Fig. 39 (after Henle, 1873) represents a horizontal section of the abdomen between the third and fourth lumbar vertebræ. The upper section, the small intestines, are spread out forward. 1, border and under surface of the liver; 2, section of the mesentery; 3, colon dextrum; 4, right kidney; 5, vena cava; 6, aorta; 7, the lower transverse portion of the duodenum shimmering through the mesentery; 8, left kidney; 9, colon sinustrum; 10, appendix epiploocus of same; 11, parietal layer of peritoneum; 12, under surface of the mesentery. Observe that Henle, the greatest of modern anatomists, draws in the sketch no mesocolon, right or left.

the arguments which make its "rock base" are called for.

In regard to the theory of displacement of the peritoneum in producing acquired mesenteries much may be said. I was led to the theory of displacement by my labors on the dog's peritoneum and viscera. It was by watching the beginning of the rotation of the intestinal loop as may be well observed in the dog, cat and human embryos which led me to the view of displacement of serous surfaces instead of their destruction in the formation of new or acquired supports. The convincing impression of displacement of serous membranes may be acquired to perfection, by observing how the left end of the great bowel moves up or pushes up the serous layer on the left surface of the duodenal mesentery. It leaves intact the membrana mesenterii propria, but raises its serous endothelial layer as this blind end of the bowel moves onward and downward in its travels. The process is beautifully observed in the slight rotation of the bowel found in early embryos or in the adult cat and dog. Yet it is not so easy of interpretation.

As supports to the theory of displacement we may say:

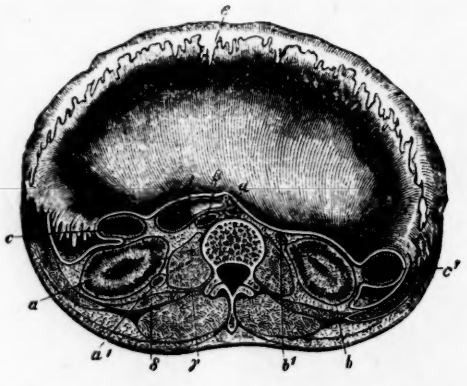

Fig. 40 (after Abey, 1871) represents a cross section of the abdominal cavity at the root of the colon transversum. Adult, one-fifth natural size. The upper surface. *a*, right, and *b*, left kidney; *a*1 and *b*1, the ureters; *c*, cross section of ascending colon, and *c*1, of the descending colon; *d*, duodenum; *e*, transverse colon; *B*, vena cava and aorta. Notice in the figure how this Swiss anatomist sketches no mesocolon, right or left, in the drawing. *S*, quadratus muscle. The peritoneal line in the figure is drawn white.

1. Coalescence of any epithelial surface is an unusual matter and even rare (without inflammation).

2. The serous endothelial layer rests on a loose bed of soft, pliable connective tissue which endows the real peritoneal layer with an extensive gliding power. I have practiced in cadavers to see how far one could shove the endothelial layer on the subperitoneal tissue and was surprised to see how far the upper layer would shift on the lower. The endothelial layer will glide extensively on the subserous tissue. In the dead, it is easy in many parts to shove the serous layer over an inch on the subserous. Hence, by slow forcing, the serous endothelial layer can be easily and extensively displaced and the slow traveling of the cecum would give ample time to displace the right serous layer of the mesoduodenum, and sufficient time to displace and drag out the serous peritoneal pouch which exists between the anterior blade of the mesogaster and the upper blade of the transverse mesocolon. It appears more reasonable to suppose the above recessens peritonei becomes obliterated by coalescence and consequent destruction of the endothelium

3. As an actual fact in favor of the displacement theory, I can only find two distinct peritoneal blades in the ligamentum gastro-colicum and only two distinct blades in the transverse mesocolon. The four layer affair of the mesocolon is no doubt an interpolation made to help out and fit the coalescence theory of Meckel.

4. It does not appear to me to be reasonable to consider the serous endothelia as not genuine, as simply connective tissue cells, ready at any moment to "physiologic coalescence," and at a chance obliterate a man's peritoneal cavity. Wherein lies the intelligence of these non-genuine endothelial connective tissue cells to refrain from obliterating the serous abdominal cavity? Why do they simply act in the great omentum and sigmoid? Is it heredity or life's inscrutable method of progress?

Finally, I mention here two points which I have carefully examined. The first is a certain white line found most distinctly on the left side of the sigmoid flexure. This line is interpreted by Toldt to be the evidence of coalescence of the left blade of the left mescolon with the layer of peritoneum on the dorsal wall. The facts in the case appear to me to be insufficient to establish the theory. However, the white line can be definitely observed, it is the interpretation of its existence which we await. It seems to me the line is evidence of displacement just as much as coalescence. I have often noted that when peritoneum turns from one surface to another, *e. g.*, at the duodenal flexure it may show a white line.

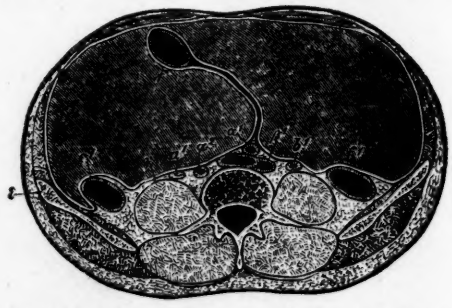

Fig. 41 (after Abey, 1871) represents a cross section of the body in the region of the iliac crests, just high enough to strike a full section of the mesenterium or the small intestine. A part of the iliac crests are cut among *e* as shown in the figure. Adults one-fifth natural size, lower surface. c1, descending colon of small intestine; f1, lower end of ascending colons; quadratus muscle. A1 and b1, ureters; a1, a2, common iliac arteries. B1 vena cava showing its septum of division preparing to divide into the two iliac veins. Observe no peritoneal coverings drawn on the posterior surfaces of its vertical colons. The peritoneal line in the figure is sketched white. The section occurs below it—both kidneys, so that only the ureters appear in the figure slightly differently located.

Again, I have frequently found in the dorsal peritoneum of both sides, but most frequently on the left side, small depression or pockets of peritoneum which would admit the point of a pencil or an object up to the size of the thumb. These pouches are lined with peritoneum, serous endothelium. Toldt again interprets these retroperitoneal pouches as evidence of progressive coalescence. I interpret them exactly opposite, as being simply the product of a local peritonitis. This local peritonitis may have originated by a gut lying on the place for some time and allowing its microbes or products to pass through the wall and infect the peritoneum locally. This is apt to occur as the dorsal peritoneum is immovable and could not get away from any infected bowel. The above two points are placed outside of the systematic argument as I consider the interpretation of them as not yet settled. No adequate explanation of the great length of the omentum has appeared.

THE LESSER OMENTAL CAVITY.

Lesser sac or bag of the peritoneum; cavity of the great omentum; cul-de-sac, or diverticle of the peritoneum; bursa omentalis; baccus peritonei; retroverticularis.

The lesser omentum is formed by elongation of the mesogaster toward the left side. The sac is at first situated behind the stomach, but later extends between the stomach and colon down in front of the small intestines, as far as the pelvis. At first the lesser omental sac is a mere depression in the right surface of the mesogaster, with development and elongation of the mesogaster, the depression in its wall deepens until the circumference of the depression contracts into a neck, the hiatus Winslowii. The atrophying liver drags the neck of the sac, Winslow's foramen to the right of the median line by means of the ligamentum hepato-duodenale. The posterior wall of the lesser omental cavity is the two-bladed mesogaster and the ascending double layered omentum and the upper layer of the transverse mesocolon. The anterior wall of the cavity is the posterior wall of the stomach above and below the two converged serous layers from the stomach descending to the pelvis, whence the layers return on themselves to the transverse colon, which by dividing, they embrace, and again converge to form the transverse mesocolon and then pass to the posterior abdominal wall. The left end is closed in by the blades of the mesogaster while the right end converges to a small neck, orificum epiploön. The lesser omental cavity is almost perfectly observed in a child of the first year or in a cat or dog of the first year. Even in early adult life the lateral edges begin to coalesce from local peritonitis.

To trace the exact lining of the adult lesser omental sac, begin at the transverse fissure of the liver and pass along the under surface of the lesser omental sac (see figure), to the small curvature of the stomach, thence along the posterior surface of the stomach to its greater curvature. Now, pass along the posterior surface of the posterior blade of the great omentum to where it turns upon itself in the pelvis and follow it upward to the transverse colon, thence to the dorsal wall along the upper blade of the transverse mesocolon. The single upper mesocoloic blade now turns upward and ascends over the pancreas, thence along the dorsal wall as far as the coronary ligament of the liver, whence it returns to the transverse fissure of the liver where we started. To trace the left wall of the sac is very easy by beginning at the right side of the right blade of the mesogaster and passing to the left to the spleen and ligamentum gastro-lienalo, thence back to the greater curvature of the stomach. The right end of the sac is constructed to a small neck, foramen primum bursa omentalis, omenti minoris, lessening the size of the sac. The shape of sac is that of a collapsed grain-bag with its neck constricted. With care it may be blown up, by forcing air through Winslow's foramen.

The size of the sac is perhaps one-quarter of the size of the skin surface of the body, as the peritoneal surface is probably equal to the skin surface. The walls of the lesser sac are composed of double blades of peritoneum, except where the posterior surface of the stomach and upper surface of the transverse colon intervenes, where only a single layer of peritoneum exists. A slight piece of spleen forms also an exception. If one introduces the finger into the neck of this sac, Winslow's orifice, in young subjects, it will pass first into an ante-room which contains Spigel's lobe. This space is smooth, closed in front by the pars flaccida of the lesser omentum and is about the size of the fist in an adult. If now the finger be pushed further on it will pass through a second and larger foramen, foramen bursa omentalis majoris (Huschke's foramen) whence the finger enters into a wide space, a pendulous bag, smooth and moist on its surface. The bag extends to the left side and to the pelvis.

On opening the lesser omental bag at a point between the stomach and colon, we observe a sleek shining peritoneum lining the whole sac. The inside of the sac extends to the left costal wall in the ligamentum phrenico-colicum. It extends to the right as far as the flexura coli hepatis and also passes on down the ascending colon to a various extent. This right part of the great omentum is known as omentum Halleri.

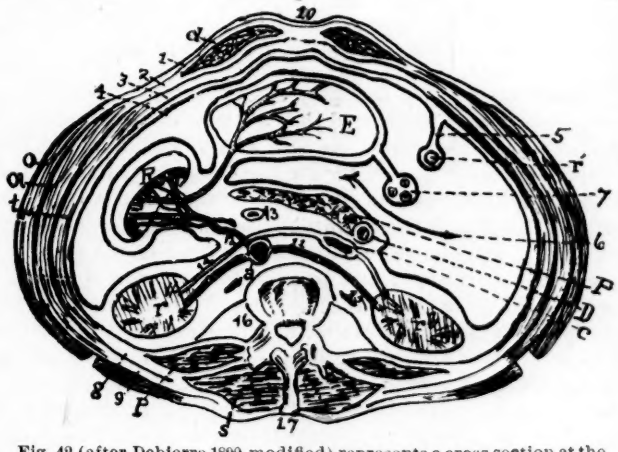

Fig. 42 (after Debierre 1890, modified) represents a cross section at the 1st lumbar vertebra to show the disposition of the peritoneum. The line of the peritoneum the artist has drawn in heavy black. r, kidney; R, spleen; e, stomach; r¹, round ligament of liver; D, duodenum in association with the pancreas P; c, vena cava; a, aorta; 3, transversalis fascia; 4, parietal peritoneum; 5, filiform ligament of liver; 6, hiatus of Winslow; 7, right border of gastro-hepatic omentum containing portal vein, hepatic duct and hepatic artery; 11, venal arteries going out of aorta. a; 12, splenic artery; 13, splenic vein; 14, venal vein; 15, pillars of diaphragm; 16, psoas. The diaphragm does not show the spleen uncovered by peritoneum on the posterior border as my dissections induce me to think is a normal condition. It is also uncovered at the hilus to transmit sustaining structures.

In the lesser omental cavity, just to the left of the septum bursa omentalis, I have found varying folds and peritoneal projections due to muscular action of the left crus of the diaphragm inducing local peritonitis. These projections are so frequent in adults as to call for mention. The lesser omental cavity is divided into two compartments (in some I noted three compartments). The division is caused by a fold of peritoneum projected into the sac by the gastric artery and to some extent by the gastric vein. The fold is one to two inches high and distinct in every body which I have examined. The fold reaches to the upper border of the pancreas and is called the ligamentum gastro-pancreaticum (Huschke). As this fold divides the lesser omental cavity into departments it may be called the septum bursa omentalis. The fold or septum separates the visceral part (Spigel's lobe) of the lesser omental sac from the non-visceral or empty part. The right portion of the sac called the bursa omenti minoris contains Spigel's lobe of the liver and its anterior wall is mainly the pars flaccida or middle portion of the gastro-

hepatic omentum. The main portion of the lesser omental sac is the bursa omenti majoris. It lies on the left side behind the stomach. The bursa omenti monoris communicates with the bursa omenti majoris by means of the foramen omenti majoris or what I have termed Huschke's foramen. The foramen omenti minoris is Winslow's foramen. The aperture between the two sacs of the lesser omental cavity varies according to the size of the peritoneal duplicature thrown up by the gastric artery.

(To be continued.)

SELECTIONS.

Suppuration from the Use of Catgut.—Lauenstein, of Hamburg, has found very frequently in catgut, purchased as "sterile," bacteria capable of development and therefore advises circumspection. Kocher, years ago, showed the danger of infection from catgut, and refers to silk as alone capable of trustworthy disinfection. In his operations for goitre he has obtained first intention much oftener with silk than catgut.—*Weiner Klinische Rundschau*, July 14, 1895.

Contributions to the Histogeny of Carcinoma. (*Virchow's Archiv.*)—It is well recognized that at the start the connective tissue takes on an active increase of its cells, the so-called cell infiltration. The writer attributes a greater significance to this proliferative process. He maintains that absence of cell infiltration at the beginning prevents the formation of cancer. Observations were made on cancer of the skin, but the conclusions apply also to primary cancer of glandular organs and the cylindrical celled: 1, the development of carcinoma of the skin starts with active proliferation of the connective tissue, which produces a sub-epithelial stratum of cell infiltration of varying thickness. 2, at the same time the epithelium is thickened, but does not yet extend beyond its lower boundary; on the contrary the connective tissue penetrates the epithelial layer, causing the appearance of a tap-like process of epithelium entering the connective tissue. 3, by this means the individual cells of this epithelial process are being continually separated from one another, until at last one or several are entirely isolated. This gives the idea of metastasis of epithelium in the connective tissue. 4, from these isolated epithelial cells is started the real development of cancer, since the cells increase in numbers and penetrate deeper into the connective tissue, particularly in the direction of least resistance, that is, into the lymph spaces so that the elements of connective tissue, filaments and cells become inclosed.—*Centralblatt für Gynäkologie*, No. VI, Feb. 9, 1895.

Subcutaneous Use of Arsenic.—Dr. Kernig reports thirty-five cases from the Obuchow Woman's Hospital. The internal use of arsenic was inadmissible on account of the condition of the digestive tract (diarrhea, etc.). Some of these were severe cases of anemia, cancer, tubercle, joined with gastro-intestinal catarrh, in which a large number of injections, 20 to 150, were used. In another group there was temporary disturbance of digestion and only six to twelve injections were used, until the internal administration could be begun. In many cases a favorable effect was at once produced, and as other means had been generally tried without effect, Dr. Kernig felt warranted in attributing the result to the arsenic. At first he used 1 part of Fowler's solution with 2 of water, and a half of a Pravaz syringe full at a dose; later, after the example of Professor Sacharjin, of Moscow, Fowler's solution undiluted. The solution must be clear. Seldom did the injection cause pain, and only once an abscess. His usual dose was 4 drops a day. No effect was produced on the intestines and no cutaneous eruption.—*St. Petersburger Medicinische Wochenschrift*, July 13, 1895.

Prophylaxis of Tuberculosis and Its Results.—After Cornet had proved that tubercle bacilli were not so ubiquitous as was before generally believed, but that they only existed when sputa were left to dry and so effect an entrance into the air passages of other individuals, prophylaxis against the bacilli seemed demanded. As early as 1886, he recommended united efforts to check the unrestricted expectoration. Cornet's efforts met with success in Prussia and later in Hamburg, but not in other German states or Austria. Although the time is yet too short for statistics, Cornet feels prompted to advance some figures, on account of the remissness of the people in carrying out prophylactic measures. In the Prussian penal institutions, the figures for tuberculosis since 1887 have fallen considerably, while in Bavaria they have remained about the same; the same holds true for the lunatic asylums. If one considers the whole population, there is in Prussia a greater decline in the mortality from tuberculosis, also in Hamburg, in the last five years since the introduction of prophylactic measures. It is manifest that in Prussia alone, from 1889 to 1893, the mortality list from tuberculosis was 70,000 less than was to be expected from the average of previous years. Virchow doubts if dependence can be placed upon these figures, owing to the shortness of the period.—*Wiener Klinische Rundschau*, July 14, 1895.

Operation for Abscess of Lung Following Rupture of Lung.—Maydl reports the case of a coachman, 29 years old, who fell under a carriage and sustained a fracture of the sixth rib in the right mid-axilla. He was found almost in collapse, the sputum was a bloody froth and there were blood and air in the thoracic cavity. Subcutaneous emphysema extended over the whole trunk and even the neck and face were greatly swollen. It was believed the fractured rib had penetrated the lung, so the ends were freely exposed and 12 cm. exsected. Two liters of fluid blood were evacuated through the opening, but no point of rupture of the lung could be made out by the hand in the pleural cavity. Later, it was made clear that the rupture existed posteriorly at the angle of the scapula. Two drainage tubes were left in the opening, but the following day these were removed and the wound was closed. No infection resulted and there was not even a serous effusion. The wound healed by first intention in a few days. The small amount of air and blood in the pleural cavity was absorbed, and the patient improved rapidly. But after fourteen days a dullness appeared in the back at the angle of the scapula, and after two weeks more there were signs of a large cavity in the lung. The sputum was purulent, abundant, and contained numerous streptococci. The patient's strength rapidly diminished. Need of relief on account of the abscess was urgent, and a month after the first operation it was undertaken. Maydl resected a rib over the area of dullness and since the two layers of the pleura had become adherent, a Paquelin cautery was pressed through a layer of lung tissue, some centimeters thick, and opened a cavity, as large as a child's head, filled with fetid fluid. From the cavity masses of gangrenous lung tissue were drawn. The largest of these was over 1 dcm. long, 4 cm. broad. Pulmonary edema followed on two occasions and a catarrhal pneumonia of the sound lung. At the time of publication the patient had been for some time without rise of temperature and was walking about. The wound was granulating rapidly, and the cavity was slowly diminishing. Maydl warns against irrigating such cavities with solutions of thymol and recommends the physiologic salt solution or boric acid.—*Wiener Klinische Rundschau*, June 23, 1895.

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SATURDAY, SEPTEMBER 7, 1895.

THE PATHOLOGY OF EXOPHTHALMIC GOITRE.

The pathology of BASEDOW–GRAVES' disease, or exophthalmic goitre is one of the questions that is just at present to the fore in neurologic medicine, and has been the subject of one or two rather noteworthy papers in recent periodical literature. Formerly the generally prevalent notion in regard to it, as far as there could be said to be any definite theory, was that it was a disorder of the sympathetic system and the vagus, probably connected with some lesion, functional or organic, of the centers in the medulla. This view, held in varying degrees of indefiniteness may be said to have predominated up to a comparatively recent date. Within a few years, however, the thyroidean theory of the affection has come into vogue and may be said to be perhaps the one that is most popular at the present time; it is that the disease is the result of an auto-intoxication from disordered action of the thyroid gland, manifesting itself by symptoms due to nervous affections, or infections, of the bulbar vasomotor centers.

It will be seen that the toxic theory carries the pathology a little farther back toward a primal cause, which fact alone is strongly in its favor with the majority, and is in accord with a tendency at the present time to refer many heretofore misty pathologies to auto-intoxications. Whether this toxic action is due to hyper- or hypo-functioning or to the derangement or alteration of the thyroid secretion, is still a question, though the weight of opinion among those who adopt the theory is probably in favor of a hyperthyroidization of the system.

That this is the last word, however, as regards the etiologic pathology of GRAVES' disease, no one can positively claim with our present knowledge. The thyroidean theory is, moreover, not universally accepted in its entirety; for example, PUTNAM, of Boston, in a very able paper (*Boston Medical and Surgical Journal*, August 8), considers it a "degenerative neurosis" dependent on original weakness or disharmony of the nerve elements and holds that its symptoms form a coherent group, "characteristic of strong emotion of the nature of expectant fear . . Although often excited by emotion, this segmented group of activities may be called out in various other ways. The prolonged existence, for example, of either one of the symptoms may after a time call out the rest." In this way, DR. PUTNAM explains how emotional excitement may give rise to the disorder, while he admits that thyroid hypersecretion may also have its part in augmenting the nervous erythism in a predisposed person.

DR. PUTNAM'S theory has in its support the well known emotional origin of many cases of this affection, and also the other fact that its one constant symptom, the one that first appears and, as pointed out by BRISSAUD, the one around which may be ranged all the others, tachycardia, is also one that is directly and almost constantly connected with emotional disturbances. It is not difficult to suppose that the psychical disturbances of emotion may, in their action on the cell elements of the nerve centers, cause derangements of distant organs which in turn may react and render permanent in some degree the original morbid condition. The intimate connections of the higher nerve centers of which we really know so little, but conjecture so much, is here strongly suggested. We need not reject the thyroidean theory absolutely; the facts so far as known seem to point very strongly to the implication of the thyroid in many cases, and we may therefore attribute to it a certain rôle in the keeping up at least of the disease. But there are equally valid arguments in favor of a prior nervous influence in the etiology of the disorder. Whether after this, the pathology is to be considered as that of hyper- or hypothyroidization or of simple alteration of the thyroid secretion, or that in its normal quantity and quality, it fails in its necessary function of counteracting some other morbid process or secretion, is a question which, as DR. PUTNAM says, we must wait for more light before venturing to decide. The theory of the participation of the thyroid gland, however, is a marked advance in the pathology of the affection, even though the exact part it takes may be still in doubt, and the original *primum movens* in its etiology is yet to some extent an open question.

The effect of the theory on the therapeutics of the disease has been marked, but it also indicates the uncertainty as to the exact nature of the thyroid participation. Results are claimed both from extir-

pation of the gland and from thyroid feeding, as well as from ingestion of thymus, considered as anti-thyroid in its action. It can not therefore be said to have developed as yet any absolutely scientific and unempirical method for all cases.

The alleviation of the disease by the cardiac tonics is still a constant experience of practitioners and indicates that we are not yet ready to altogether reject the other symptomatic treatment.

CHOLERA IN THE PACIFIC.

A ripple of excitement has been created in sanitary circles by the news of cholera in the Sandwich Islands, its spread in Russia, China, and Japan, and its invasion of Corea, to say nothing of the reported cases at Grimsby in England. As early as July 25 last, Passed Assistant Surgeon WILLIAM G. STIMPSON, U. S. M.-H. S., was led to treat the British steamship *Antwerp City*, as a cholera-infected vessel on her arrival at Port Townsend, Wash., from Hiogo, Japan; but the port authorities of San Francisco seem to have been "caught napping" by the steamer *Belgic* last week, which vessel obtained free pratique through gross misrepresentation of the events of her voyage. It remains to be seen what action will be taken with her officers should she again enter the Golden Gate.

There is, probably, no serious ground for apprehension in the present situation; but the JOURNAL can not refrain from warning against a too implicit reliance on quarantine restrictions to protect this country against an invasion of the disease. Both the Atlantic and the Pacific seaboards are now threatened, and the ease with which the passengers of the *Belgic* passed through the San Francisco quarantine, from a vessel which is now known to have had three cholera deaths on board during her voyage from China, shows again what an elaborate system of leakage the quarantine of the period may prove to be.

We must repeat our lesson of a few weeks since; we may not be able to shut out cholera from our shores by quarantine; but we can and should make our environment so wholesome and cleanly as that it shall be fatal to the cholera germ as well as to the germs of all other filth diseases. And in this connection it is well to remind sanitary and civic authorities that wherever typhoid fever exists and flourishes, there also may Asiatic cholera exist and flourish.

There is a warning in this for many of our American cities. Pittsburg, for example, where typhoid is again epidemic, and in a multitude of smaller places in which the disease is now prevailing with more than its usual autumnal increase. The aspiring western metropolis, Chicago, is by no means beyond the danger line in this respect; the almost constant presence of the disgustingly suggestive *coli communis* in its public water supply is pregnant with meaning to the sanitarian, and the city is absolutely without any sort of hospital provision in case of any epidemic but one of smallpox. Even if the new isolation hospital were ready for use—which it will not be for many months—it would be wholly inadequate for the needs of nearly one hundred and ninety square miles of territory. There should be a supply of the small portable hospitals provided at once—hospitals capable of receiving eight patients each, complete in themselves and ready to be set up in any epidemic center in an hour's notice. When a thing of this sort is needed, it is needed at once. Epidemic diseases don't usually wait to give warning and allow time for preparation. Chicago's Health Department should take immediate action in this matter—not especially with reference to Asiatic cholera, but to the epidemic diseases in general.

THE INSANITY OF CONDUCT.

In the discussion of a paper read before the British Medical Association at its recent meeting, DR. CHARLES MERCIER laid down the following four propositions which have an important bearing as regards the medico-legal relations of mental disorder: 1, that there are cases in which insanity is evinced by conduct and can not be established from mental disorder alone; 2, that there are cases in which disorder of the mind exists without insanity; 3, that therefore insanity is not essentially a disorder of the mind nor ought insanity and unsoundness of mind to be used as convertible terms; 4, that our conception of insanity is not complete until it is understood to include as a necessary and integral element, disorder of conduct.

While the limitations of the term "mind," as here used may be questioned, it seems well to state these propositions as including a valuable truth that has not yet penetrated to any extent the intricacies of the legal intellect. Conduct is simply a concrete manifestation of mental action, and therefore when absolutely irrational, though assisted with apparently perfect and even brilliant intellection may be a very clear evidence of insanity, entirely apart from delusions or other common symptoms of mental disease. Purposed and elaborated actions are evidence of the functioning of the intellectual organs of the brain as much as motion is of that of the motor centers, and when they are disordered and irregular in their type, they mean mental disorder as truly as do incoherent or irrational speech; indeed far more than the latter, which is a possibility with the perfect retention of the judgment and control of conduct that are the essential elements of responsibility and sanity. These may be deficient or absolutely lacking with the most perfect and brilliant intellection, and the condition be only revealed by irrational acts. That which is self-evident to an

alienist and psychologist seems to be one of the most difficult of all truths in its practical application.

A man may make himself a public and private nuisance, a laughing stock to the rabble, and even very dangerous in his eccentricities to himself and others; provided he can talk rationally before the court all the evidence is swept aside as worthless, as compared with that which is under the eyes or perhaps we should say the ears, of the legal experts. Even if committed to an asylum, especially if he possess legal knowledge or have officious legal friends, it is impossible to hold him, notwithstanding the fact that his insanity is essentially one from which society most needs protection. DR. RAY gives a very striking account of a case of insanity of conduct of this kind; our knowledge of it is, therefore, not a recent acquisition; instances are indeed of not infrequent occurrence, but its legal status is as yet undefined and its settlement is one of the social needs of our day. This, however, can only be effected by a general psychologic enlightenment of the legal profession, not perhaps a result to be hoped for in the very near future.

THE "NEW AILMENT" (SCHNEIDERITIS) OF LONDONERS.

According to the *Sanitary Record* for July 26, the condition of the streets of London, brought about in part by the prolonged dry weather, and in part by the kind of materials used for street paving, have caused not a little irritative trouble which for convenience has been termed the "new ailment." The *Record* also, in this same connection, calls aloud for more water in cities, especially in London; the supply of water in that city has never yet been as lavish as it should be, and not at all in keeping with its many other civic improvements. London has not enough drinking fountains for the public, and no very definite legislation compulsory as to the laying down of water pipes for rented properties. In other words, London has shown itself backward in procuring a sanitarily lavish supply of sweet pure water.

The *Sanitary Record* says:

"The question of the best kind of material for the pavements of the London streets is not unlikely to be again agitated, if there be truth in the view that what is called the 'new ailment' is due to the deleterious action of the *débris* that accumulates on the wooden pavement now in general use. The mucous membrane of the nose, which is the part chiefly affected in the ailment, becomes inflamed and thickened, and the blood vessels that ramify through this membrane become turgid, with the consequence that bleeding is set up on very slight provocation.

"The immediate occasion of the outbreak has apparently been the prolonged dry weather, that has proved injurious to many things beside the mucous membrane of the nose; and it is believed that the affection is due to the innumerable minute particles of straw and other organic substances that naturally accumulate when there has been no sufficient flushing of the pavements by rain or otherwise. Now that the weather has changed, we may hope to hear no more of this trouble; but its presence is one more illustration, on the negative side, of *the extreme value of rain as a hygienic agent*. It may not always be pleasant, but it is health-bringing.

"'Water is best.' The truth of that old Greek adage is continually receiving fresh illustrations. But it has not yet taken a firm hold of all the members of the community—even of all sanitary authorities. For complaints have still from time to time to be made regarding the *inadequate supply* of water furnished for the wants of the people; for *drinking*—which is a kind of flushing of the human body—for *bathing*, for *washing*, and for the essential purposes of *drainage*. And the specific complaint is being made, we observe, that in the administration of the Public Health Acts, the clauses that refer to the matter of water supply are interpreted without due regard to the public welfare.

"Every owner shall provide a water supply at or near. There is a delightful elasticity, it will be observed, in this word 'near,' which enables it to lend itself very readily to various interpretations. And it is complained that in the interpretation of the word some sanitary authorities have been neglectful of their duty, in not insisting that a supply shall be furnished even when it is reasonably required. Cost must, of course, be considered. It is not to be expected that, whatever may be the expense, water is to be introduced wherever it may be thought needful. But individuals and communities alike can not easily learn any wholesomer lesson than that wise expenditure in such matters is the truest economy."

THE MISSISSIPPI VALLEY MEDICAL ASSOCIATION.

The meeting of the Mississippi Valley Medical Association at Detroit was characterized by unusual harmony and the papers presented were above the average. PROFESSOR PEPPER'S Address in Medicine which we shall have the pleasure of presenting to our readers in full next week, was a masterly eulogium of DANIEL DRAKE, and a faithful portrayal of the marvelous changes that have taken place in the great Interior Valley since the time of DRAKE.

The popular author, the grandeur of the theme, the audience comprising the descendants of those hardy pioneers who have made the valley what it is to-day, and the historic city in which the meeting was held all conspired to make it an occasion long to be remembered in the civic annals of Detroit and the whole valley.

The other addresses were excellent, notably the address of PRESIDENT WISHARD and the address of PROFESSOR MCGRAW which we publish in this issue.

The Committee of Arrangements, under the admirable management of DR. H. O. WALKER, left nothing undone that could add to the international reputation of Detroit as the hospitality center of the communities living on the Great Lakes.

The election of DR. H. O. WALKER to the Presidency was a public testimony to his high standing in the

Association, and is an honor which he has worthily won.

The selection of Minneapolis as the next place of meeting was wise, and gives assurance in advance, if any were needed, of the prospective success of next year's meeting.

CORRESPONDENCE.

A Philological Problem from Philadelphia.

PHILADELPHIA, PA., Aug. 15, 1895.

To the Editor:—In one of the latest numbers of the JOURNAL is an extract from the *Deutsche Medicinische Wochenschrift* on "The New Anatomic Nomenclature," and the number also contains an editorial commendation of the idea. In reading the extract I note that, "it was resolved that the terms should be in one language, that is, Latin designations only. . . . The names shall be Latin, and etymologically correct."

That promises well, but when I look at the examples given by the JOURNAL, I find the first one given to be "osteologia," a pure Greek word, with nothing Latin about it! Liddell and Scott define *Οστεολογια* as "the science which treats of bones." "Splanchnologia" and "angiologia" are also Greek, from *Σπλαγχον* viscera, and *Ἀγγεῖον* a blood vessel, respectively, and these are not the only examples.

I do not wish to be considered a captious critic, but isn't it rather singular that a nomenclature which professes to contain only Latin terms, and those etymologically correct, should bristle with so many pure Greek words?

Very truly yours, D. W. NEAL, M.D.

ANSWER:—We do not dispute the Greek origin of the words mentioned, but they are transferred words, and used in Latin with entire propriety. Osteologia is given in Foster's Medical Dictionary as a Latin word. Leverett's Latin Lexicon gives osteologia as the Latin synonym for the English word, osteology. So also does Wm. Young in his Latin English Dictionary. Nearly all scientific words used by the Latin writers were transferred bodily.

A Question of Ethics.

ORAN, MO., Aug. 8, 1895.

To the Editor:—Will you kindly answer the following question in your next issue:

Is it unprofessional or not, to divide your fees with "Granny women?" I have a colleague who gives his assistant midwife $1 while he takes $9 for his obstetrical fee. I told him that it was the business of the patron to pay the fees of both physician and nurse, and that when a physician divided his fees with would-be midwives it looked very much like "drumming" for practice. Please answer and oblige,

Very respectfully yours, W. P. HOWLE, M.D.

ANSWER:—The dividing the fee in an obstetrical case with the nurse or other attendant is in the nature of drumming for practice, or the acceptance by the physician of a percentage from an apothecary. No self-respecting physician should indulge in such methods.

A Staunch Defender.

ATLANTA, GA.

To the Editor:—The sanious exudation from a gangrenous ulcer does not indicate more clearly its true character, than does the utter disregard of correct principle show the reviewership of the communication in your number of August 24, headed, "The Code, Once More," and signed "Amicus Veritatis."

It should have had for a caption, "No Code," and for signature, "Vox Asini." Respectfully, VIRTUS.

BOOK NOTICES.

The Cell, Outlines of General Anatomy and Physiology.—By DR. OSCAR HERTWIG, Professor Extraordinarius of Anatomy and Comparative Anatomy, Director of the II Anatomical Institute of the University of Berlin. Translated by M. CAMPBELL and edited by DR. HENRY JOHNSTONE CAMPBELL, of London. With 168 illustrations, 8 vo., cloth, pp. 368. Price, $3. London: Swan, Sonnenschein & Co. New York: MacMillan & Co. 1895.

The author has in this book not only prepared a supplement to his work on embryology, but has endeavored to fix the scientific standpoint at present occupied by the doctrines of cell and tissue formation.

Much in the book is necessarily theoretical, and may yet be changed by the advance of science, for as the author well says: "The cell is a marvelously complicated organism, a small universe, into the construction of which we can only laboriously penetrate by means of microscopic, chemico-physical and experimental methods of inquiry."

"In many respects," says our author, "the cell theory is the center around which the biologic research of the present time revolves," and while he admits with Max Schultze that "the protoplasm of plants and animals and the sarcode of the lowest organisms are identical," and that the term "cell" is incorrect, he yet retains it under the definition that the "cell is a little mass of protoplasm, which contains in its interior a specially formed portion, the nucleus." The chemico-physical and morphologic properties of the cell are first described, and then the vital properties are treated of. These include: 1, Contractility; 2, Irritability; 3, Metabolism; 4, Reproduction. The work concludes with a chapter on "the cell as the elementary germ of an organism," and "theories of heredity." This book, then, is seen to deal with one of the most important of all the fundamental problems of biology, and we can commend it to the readers of the JOURNAL as embodying in entertaining and easily understood language, the most advanced theories concerning the anatomy and physiology of that mass of protoplasm which we term a cell, and of its nucleus, which in the present state of knowledge we must regard as the true elemental organ of life.

Parvin's Science and Art of Obstetrics; the Science and Art of Obstetrics. By THEOPHILUS PARVIN, M.D., LL.D., Professor of Obstetrics and Diseases of Women and Children in Jefferson Medical College, Philadelphia. New (3d) edition. In one very handsome octavo volume of 677 pages, with 267 engravings, and 2 colored plates. Cloth, $4.25; leather, $5.25. Philadelphia: Lea Brothers & Co., Publishers. 1895.

The publication of the new edition of Parvin's standard treatise emphasizes well the fact that it has for some years supplied the need for a new text-book from the great Philadelphia school. The University had Dewees and Hodge, and Jefferson had Meigs. The long sway held by Meigs at Jefferson and the great popularity of his text-book, based as it was on elegance of style, quaintness of expression, keen observation and natural eloquence, made it rather difficult for Professor Parvin, but it must be conceded that he well filled the vacancy. His scientific knowledge, his wide range of information and his vast acquaintance with general literature, enabled him to prepare a book that is not less entertaining from a literary standpoint than from a professional one. Much valuable historical matter finds a place in this volume.

Old members of the ASSOCIATION will recall with pleasure that Professor Parvin presided at the thirtieth annual meeting at Atlanta in 1879, and will rejoice to see that although more than a quarter of a century has elapsed, the venerable ex-President revises and largely re-writes a work which shows him still in the foreground in his chosen field of medical science.

Modern Medicine and Homeopathy. By JOHN B. ROBERTS, A.M., M.D. 16 mo., cloth, pp. 72. Price, 75 cents. Philadelphia: The Edwards & Docker Co. 1895.

It is with pleasure that we record the publication of the two essays of Professor Roberts in a form more convenient for preservation and reference than the Transactions of the Society in which they were read, or even our beloved JOURNAL in which one of them was previously printed. These essays, which are written in a spirit of friendliness to our erring brothers, have given rise to some controversy, on the ground that Dr. Roberts has to the homeopathists been

"To their virtues very kind,
To their faults a little blind,"

but it is evidently in a purely philanthropic spirit that the essays were written, and they have very appropriately emanated from the City of Brotherly Love, and Dr. Roberts.

Those who wish to become acquainted with the peculiar tenets of the homeopathic sect, in their relations with modern medicine will do well to procure this little work—which, while giving the points in which "homeopathy" still adheres to the teachings of modern medicine, sets forth clearly and without abuse, the fallacies and distorted views held by some of the sectarians under consideration.

The Pocket Materia Medica and Therapeutics.—A Resumé of the Action and Doses of all Officinal and non-Officinal Drugs now in common use. By C. HENRI LEONARD, A.M., M.D., Professor of the Medical and Surgical Diseases of Women and Clinical Gynecology in the Detroit College of Medicine; member of the AMERICAN MEDICAL ASSOCIATION, etc. Second edition, revised and enlarged. Cloth, large 16 mo., 367 pages, price, postpaid, $1. Detroit: The Illustrated Medical Journal Co., Publishers. 1895.

The second edition of this popular therapeutic work has had sixty-seven pages added to it, beside typographical errors corrected, etc. A new and complete cross-index has been prepared, which renders the quick finding of a non-familiar drug possible. This is an important feature lacking in many ready-reference books. The metric doses have been given throughout and the book has been brought up to date. Its alphabetical arrangement makes it very convenient for reference.

PUBLIC HEALTH.

How to Prevent the Sale of Hurtful Cosmetics.—Notwithstanding all that has been published regarding the poisonous nature and injurious effects of the nostrums advertised to improve the complexion, still their sale goes bravely on. It is everywhere a difficult traffic to control, but the police of Berlin have hit upon an ingenious way of putting a stop to their sale, without invoking the law against the advertisers. They insert in all the papers of the city a notice stating that they have caused an analysis to be made of this or that preparation, and that its ingredients are so-and-so; and they also add the intrinsic value of the ingredients. In one celebrated preparation, they showed that a compound that cost 1 cent was sold for $2.50 a bottle. They do not concern themselves with non-poisonous nostrums.

Seaboard Precautions as to Cholera.—The August issue of *Public Health* (London) quotes from the Annual Report of Dr. D. S. Davis, Health Officer of Bristol, England, his observations regarding the theory of maritime precautions for exposed cities against cholera. Dr. Davis' report for 1894 offers the following points germane to conditions existing in England:

"The aim of medical inspection, which has supplanted quarantine in England as a means of dealing with imported cholera, is briefly as follows:

"1. By medical inspection of persons arriving, to detect *actual cases of cholera*, and to secure proper isolation of patients in hospital, and disinfection of their belongings, and of the berths or places they may have infected.

"2. By the same medical inspection, to detect *cases apparently sickening*, and so to isolate and watch them.

"3. To *notify forward* to the sanitary authorities of the districts whither they are bound, the names and addresses of the rest of the crew and passengers, who are apparently well, but who may possibly have the disease in an undeveloped form. The responsibility of watching and caring for any cases which may develop after arrival at their destination devolves upon the respective sanitary authorities having charge of such districts.

"In short, medical inspection *deals with actual and probable cases* but can only *notify forward possible cases*. Herein it differs from quarantine, in that no cases except actual or threatened cases are detained at the port of arrival, nor is the vessel detained when a hospital is available, except a reasonable time for purposes of disinfection; and in that the responsibility of dealing with any cholera that may arise is shared not only by port districts, but by inland districts, to which some one of the cases allowed to go forward may take the disease. But such inland districts have the advantage of being forewarned, and any spread of the disease must be a measure of their own neglect.

"Fortunately, the incubation period of cholera is generally short (a few days only), so that a long distance ship with no recent cases on board involves, as a rule, little danger." This is in effect the American practice, and it has taken the British all these years to learn that although we still use the word "quarantine," we long ceased the practice of detention *per se*.

Heredity of Tuberculosis.—At a recent meeting of the *Societe de Biologie*, of Paris, MM. Bar and Renon presented a communication concerning the results of their efforts to elucidate the question of direct transmissibility by the placenta of the bacillus of Koch from the mother to the fetus in the human species. M. Bar had, in five instances, obtained at the moment of birth a certain quantity of blood as it flowed out of the placental end of the umbilical vein, and injected it at once under the skin of the abdomen of guinea pigs. In three cases the results were negative—that is, the animals did not become tuberculous—but of the remaining two, one was that of a woman in the third stage of consumption, and whose expectoration contained the tubercle bacilli of Koch. She was delivered of a fetus that had died the day previous; the placenta did not present any apparent lesions. The blood flowing from the umbilical vein was injected into a guinea pig, which succumbed two months later from tuberculosis of the liver and spleen. No signs of tuberculosis were discovered in the organs of the fetus on necropsy. However, the pulp of the liver and lungs was injected into two more guinea pigs, both of which succumbed with all the signs of tuberculous infection, ulcer at the seat of inoculation, granulation of the liver and spleen, etc. In the second case, the mother had large pulmonary vomicæ, but the expectoration had not been tested. The child died on the fortieth day from broncho-pneumonia. At the moment of birth the blood of the umbilical vein was injected into two guinea pigs. One of the animals lived, while the other succumbed, with a chancre of inoculation and a generalized visceral tuberculosis.

We note that some of our foreign exchanges profess to regard these results as conclusive of the heredity of tuberculosis—the Paris correspondent of the *Medical Press* of the 21st ult., for example, asserting that the authors have "discovered the bacillus in the blood of the fetal cord;" that the discovery "is, consequently, of the highest interest, confirming as it does clinical observations, and settling the question once and for all." At this distance from France it does not appear that MM. Bar and Renon have set up any such claim; on the contrary, there is no mention in the correspondent's account of the detection of the tubercle bacillus in anything but the sputum of one of the two women, and it is not definitely asserted that the other had tuberculosis at all—"pulmonary vomicæ" are not always and necessarily tuberculous, although, of course, the majority are. The question of the heredity of tuberculosis may not be "settled once and for all" in this out-of-hand fashion. As thus far made known, the experiments cited are by no means conclusive, and they add absolutely nothing confirmatory of the observations of such students as Baumgarten, Birch-Hirschfeld, Hericourt and Richet, Whittredge Williams and others in this field, who have demonstrated the direct transmission of the bacilli from the mother to the fetus.

Churning the Milkmen.—The usual periodical agitation of the milk question is on in great force and vigor this season and it really seems as though some good results might accrue. The most comprehensive and thorough work has been that of the Special Analytical and Biological Commission of the *British Medical Journal* on the milk supply of London. The preliminary report of this Commission was published July 6, and the editorial review is given in the issue of August 24. The closing paragraph is as follows: "The moral of the whole matter is that producers and vendors must be compelled, within reasonable limits, accurately and fully to describe the articles which they supply to the public, and that the standard of composition for a natural product such as milk shall not be that of an abnormal fluid yielded by a diseased or improperly fed animal, but shall be the normal composition which, within certain well-ascertained limits, the mixed milk of healthy and properly fed cows is known to possess. 'Milk' does not mean 'thinned milk,' nor does it mean 'separated milk.' These, which are, of course, articles of commerce, should be described by their distinctive titles. Condensed milk means condensed whole milk, and if a preparation which has been obtained by condensing separated milk is called condensed milk, a distinct fraud is perpetrated upon the public. If sophistication, adulteration and the production of milk under insanitary conditions are to be suppressed or appreciably minimized, an awakened and vigorous public feeling on the matter is essential. It rests mainly with the medical profession to bring this about." Thus far Mr. Ernest Hart, and it pretty fully indicates the principal evils which beset the milk supply of most large cities—London as well as New York, Chicago equally with Philadelphia. But Dr. Gould, in the *Medical News*,[1] is not so sanguine that cow's milk, howsoever pure, will materially reduce the waste of infant life and asserts that, notwithstanding all the improvement that has been effected in the milk supply of cities, "hand-fed babes die in summer now as they did twenty years ago." He thinks that it would be well for medical men to direct their energies toward "bettering or rather increasing the number of human milkers instead of looking for substitutes." "If," he says, "the time and talent now expended in endeavoring to obtain a pure supply of cow's milk were directed to this other question, and the subject freely discussed in the lay press as well as in the medical journals, we would have a lessened infant death rate and the problem 'how and what to feed the baby' would not excite so much attention as it now does." Meanwhile, what the newspapers call the "crusade" against the milkmen is being vigorously pushed both in New York and Chicago and the lower courts of both cities are congested with the multitude of "milk cases." To show that there is need of some such action it is only necessary to cite one statement made by Dr. Gehrmann of the Chicago Municipal Laboratory. He says he has made no bacteriologic examination of Chicago milk without producing numerous colonies of the unspeakable bacillus coli. Mr. Sidney Rowland of the English Commission testifies to the same effect. This is damning proof of filth of the most disgusting sort in the dairies, the vessels and the water used and on the hands and persons of the milkers and handlers. But a municipality can not deal with these horribly insanitary conditions except in an indirect way. Six-sevenths of the London milk supply, as large a proportion of that of Chicago and a still greater proportion of the New York supply is furnished from territory beyond the jurisdiction of the several cities. Only the State can correct this basic evil and that by a rigid sanitary inspection of dairies and milk-producing plants through State Boards of Health and kindred agencies. Until this is done and the remedy is applied at the source and beginning of the evil the efforts of municipalities will continue to be ineffectual.

Reduction of Diphtheria Mortality.—At the recent meeting of the British Medical Association, during the discussion on the antitoxin treatment of diphtheria, statistics were presented from the hospitals of England, Scotland, Munich, Berlin and New York, showing a striking reduction of the mortality from diphtheria under the use of the antitoxin.

[1] The Milk Question, Aug. 31, 1895.

Dr. E. W. Goodall, Medical Superintendent of the Eastern Hospital, Homerton, presented the following results of 24[illegible] cases under his own care or observation between January [illegible] and June 30 of this year:

Treated with antitoxin:

Under 5	57 cases, of whom	17 died	29.8 per cent.
5 to 10	36 cases, of whom	6 died	16.6 per cent.
10 to 15	12 cases, of whom	1 died	8.3 per cent.
	105	24	22.8

Treated without antitoxin:

Under 5	67 cases, of whom	30 died	44.7 per cent.
5 to 10	46 cases, of whom	14 died	30.4 per cent.
10 to 15	23 cases, of whom	1 died	4.3 per cent.
	136	45	33.6

Prof. Dr. Von Ranke, of the University of Munich, between Sept. 24, 1895, and July 1, 1895, had 163 cases of primary diphtheria, with a mortality of 29 = 17.7 per cent. Of these there were 154 cases bacterially diagnosed as undoubted diphtheria, with a mortality of 18.8 per cent. The necessity of a prompt resort to the serum is shown in the following figures:

Of 19 cases treated on the first day	1 died	5.2 per cent.
Of 47 cases treated on the second day	4 died	8 5 per cent.
Of 39 cases treated on the third day	7 died	17.9 per cent.
Of 19 cases treated on the fourth day	3 died	15.8 per cent.
Of 9 cases treated on the fifth day	1 died	11.1 per cent.
Of 10 cases treated on the sixth day	4 died	40.0 per cent.
Of 15 cases treated on the seventh and later	7 died	46.6 per cent.

Mortality of patients according to age:

Under 12 months	5, all of whom	died	100.0 per cent.
Under 2 years	24, of whom	9 died	37.5 per cent.
Under 3 years	25, of whom	3 died	12.0 per cent.
Under 4 years	32, of whom	4 died	12.5 per cent.
Under 5 years	17, of whom	2 died	11.8 per cent.
Under 6 years	20, of whom	2 died	10.0 per cent.
7 and over	39, of whom	3 died	7.7 per cent.

Mortality of primary diphtheria in former years:

1887	42.2 per cent.	1891	46.0 per cent.
1888	48.9 per cent.	1892	56.2 per cent.
1889	46.5 per cent.	1893	46.0 per cent.
1890	47.9 per cent.	1894	57.0 per cent.

Since beginning serum treatment 17.7 per cent.

The mortality has, therefore, been reduced considerably more than one-half from that of the best ante-serum year, and more than two-thirds from that of the worst. Prof. Dr. A. Baginsky, of the University of Berlin, reported that during the past year he had treated 525 cases of diphtheria with serum. Previous to the introduction of this form of treatment the mortality had, during four years, averaged 41 per cent. When the cases come to be examined in detail the improvement is even more striking.

Of cases	Previous Mortality. Per cent.	Present Mortality. Per cent.
Under 2	63.30	25.20
2 to 4	52.85	17.12
4 to 6	37.90	17.24
6 to 8	27.41	11.39
8 to 10	19.35	5.11
10 to 12	15.07	10.00
12 to 13	13.00	0.13

As to the general condition of the patients, Dr. Baginsky considered that the serum treatment not only reduced the mortality, but that the general condition of the children was improved; that there was very much less danger from heart disease; that there were fewer cases of nephritis; that there was less danger of laryngeal stenosis—no case in his experience ever having had laryngeal obstruction unless this condition had already begun, and that intubation was always possible, whereas under the older treatment tracheotomy was very often necessary. Finally, Dr. Herman Biggs, Bacteriologist to the New York City Board of Health, stated that he had had under his charge between 400 and 500 cases of diphtheria which had been treated with antitoxin in their own homes. These had all been severe cases and the mortality had been slightly over 16 per cent. The mortality for the whole of New York, he added, had been reduced over 40 per cent. Dr. Biggs then dwelt upon the importance of the antitoxin in preventing the spread of the disease by rendering those who were exposed to the infection immune. In one hospital there had been 107 cases of diphtheria in 108 days; immunizing injections of the serum

were then resorted to with all the inmates—200 units of Behring's preparation being used in each case. During the next thirty days only one very mild case occurred; in the following thirty days another mild case occurred and then five more. Injections of 225 units were then used and there were no more cases. The same result was obtained in three other institutions and the value of the immunizing power of the antitoxin was conclusively demonstrated. The speaker concluded by saying that in over eight hundred subjects treated for the purpose of rendering them immune he had in no case observed any unfavorable symptom; in a few cases rashes, apparently urticarial in nature, had occurred on the eighth day, and in some there had been a temporary rise in temperature which, however, had in no case resisted treatment more than twelve hours.

Smallpox Epidemic in London.—The belief which was expressed about the middle of August that the epidemic manifestation of smallpox in London had reached its highest point, with 327 cases under treatment on the 10th of that month—proves to have been not well founded. A cable dispatch of the 3d inst. announces that the disease has been officially declared epidemic in the east districts, in which there were 482 cases under treatment on the 2d inst. This rapid increase of the disease during the summer season excites grave apprehension as to its possible extent during the approaching cold weather, and the Local Government Board is putting forth every effort for its suppression before winter. So far as can be ascertained the disease first manifested itself in Whitechapel, and the *British Medical Journal* of August 24, significantly adds, in this connection: "For some time past the Board of Guardians have not enforced the [vaccination] act, there being a majority of anti-vaccinationists on the Board."

SOCIETY NEWS.

Medico-Legal Congress.—Dr. Forbes Winslow, of London, sailed on August 24 from Southampton and will preside as chairman over the Department of Insanity and Mental Medicine at the Medico-Legal Congress, held at the United States Court Room, Post Office Building, New York, on September 4, 5 and 6. He will also read a paper at the same congress on "Suicide as an Epidemic." Dr. Winslow will make an extended visit in the United States.

American Association of Obstetricians and Gynecologists.—The eighth annual meeting of this flourishing society will be held in Chicago Sept. 24, 25 and 26, 1895. The following is the preliminary program:

President's annual address, J. Henry Carstens, Detroit.
Relation of pelvic suppuration to structural changes that may occur in the Fallopian tubes, A. P. Clarke, Cambridge.
Nephrorrhaphies, George Ben Johnston, Richmond.
Detached fibroids, George H. Rohé, Catonsville.
A clinical contribution to lateral displacements of the uterus, Edward J. Ill, Newark.
Appendicitis, A. Vander Veer, Albany.
Intermediate treatment of puerperal sepsis, A. B. Miller, Syracuse.
Kraurosis vulvæ, a contribution to its pathology and therapeutics, H. W. Longyear, Detroit.
Report of three recent cases in gall-bladder surgery, Edwin Ricketts, Cincinnati.
Subject to be announced, H. E. Hayd, Buffalo.
Intestinal obstruction following peritoneal operations, A. H. Cordier, Kansas City.
Subject to be announced, S. Y. Howell, Buffalo.
Cure of tubal distension without laparatomy, F. A. Glasgow, St. Louis.
Subject to be announced, W. B. Dorsett, St. Louis.
Subject to be announced, C. C. Frederick, Buffalo.
Hysterectomy in bilateral diseases of the appendages, giving remote results, Florian Krug, New York.

Discussion: Vaginal hysterectomy *versus* Abdominal section for pus tubes. (*a*), title unannounced, (affirmative) X. O. Werder, Pittsburg; (*b*), when shall hysterectomy accompany bilateral removal of the appendages? Reuben Peterson, Grand Rapids; (*c*), pathologic and surgical contraindications of the vaginal route in dealing with puriform diseases of tubes and ovaries, Joseph Price, Philadelphia; (*d*), title unannounced, (affirmative) George H. Rohé, Catonsville.

Discussion: Eclampsia gravidarum. (*a*), Etiology, Frederick Blume, Allegheny; (*b*), Pathology, George F. Hulbert, St. Louis; (*c*), title to be announced, W. H. Taylor, Cincinnati; (*d*), Prophylaxis, H. W. Longyear, Detroit; (*e*), Puerperal convulsions *versus* Insanity, W. P. Manton, Detroit; (*f*), Treatment, J. M. Duff, Pittsburg; A. H. Wright, Toronto: Thomas Lothrop, Buffalo.

Exhibition of various types of rectal papillæ, R. T. Morris, New York.
Subject to be announced, E. Arnold Praeger, Los Angeles, Cal.
Ruptured interstitial pregnancy, L. H. Dunning, Indianapolis.
Has gynecology received just recognition as a specialty? M. B. Ward, Topeka.
Indications for operation in puerperal sepsis, L. S. McMurtry, Louisville.
Pneumo-peritoneum, James F. W. Ross, Toronto.
Subject to be announced, J. B. Murphy, Chicago.
Subject to be announced, Charles A. L. Reed, Cincinnati.
Subject to be announced, M. Rosenwasser, Cleveland.
The regular program will be issued September 1.

J. Henry Carstens, President.
William Warren Potter, Secretary.

Section on State Medicine.—Minutes of the proceedings of the forty-sixth annual meeting of this Section of the American Medical Association held at Baltimore, Md., May 7 to 10, 1895. The first session convened in the north side stage room of the new Music Hall at 3 o'clock P.M., Tuesday, May 7, the chairman, Dr. L. H. Montgomery of Chicago, presiding and Dr. Charles H. Shepard of Brooklyn, N. Y., Secretary.

After registration: The next order of business Dr. James F. Hibberd was requested to occupy the chair pro tem, while the chairman read the Annual Address which was upon motion referred for publication.

The first paper was by Dr. Henry O. Marcy, entitled "Sanitation in Street Pavement." Discussed by Drs. A. L. Gihon, Jerome Cochran, G. P. Conn, C. F. Ulrich, B. A. Randall, J. A. Stewart, D. W. Cathell, R. Beverly Cole, W. C. Woodward and the author, and referred for publication.

The next paper read was by Dr. C. F. Ulrich, on "Physical Training in Childhood and Youth as a Preventive of Disease," which was upon motion of Dr. I. N. Quimby referred for publication.

Dr. B. Alexander Randall read the next paper on "Hygiene of the Eyes and Ears in Schools," referred for publication in the Journal.

The following gentlemen were appointed members of the Business Committee to represent the Section during the meeting of the Association: Drs. George W. Stoner, J. J. Kinyoun and Dr. J. A. Stewart of Baltimore.

The paper "Anticipative Treatment of Disease, Organically, Functionally and Specifically," by Dr. W. G. A. Bonwill, read by title, which was followed by the reading of a paper entitled, "The Proper Relations of National, State, and Municipal Quarantine," by Dr. Jerome Cochran. Discussed by Drs. A. G. Field, Woodward, Ulrich, Rogers and the chairman and referred for publication in the Journal.

Upon motion of Dr. Charles H. Shepard, seconded by a number of the members, the following suggestion embodied in the address of the chairman was unanimously adopted, and referred to the general session of the Association with the request that it be read there and similar action taken regarding the appropriation. As it is in reference to the proposed Department of Public Health, the suggestion is herewith transmitted in its entirety:

"That we advise and recommend to the Association in general session, ere its final adjournment, that the perpetuity of the special commitee appointed by the Association in 1891 be continued. To memorialize Congress to establish another branch of the Federal Government, known as the Department of Public Health, with a medical secretary of same. That this committee be clothed with additional substantial authority, and with the request also from this Section that sufficient financial aid from the Treasury of the Association be appropriated, which should not be less than

$1,000 for the ensuing two years to defray the necessary expenses of the committee."

After the appointment of the nominating committee, which consisted of Drs. G. P. Conn, C. F. Ulrich and A. G. Field, the Section adjourned until 9 o'clock A.M., Wednesday.

SECOND DAY—WEDNESDAY, MAY 8.

The first paper "Lighting the School Room" with illustrations, was read by Dr. Archelaus G. Field, and upon motion Dr. Field was permitted to re-read his paper before the Section in Ophthalmology if agreeable for him to do so. Otherwise the same was referred for publication.

"Depopulation of Civilized Nations" was the next paper announced to be read by Dr. James W. Cokenower. As the author was not present it was read by title.

The following papers were also read by title, in the absence of the authors: "Tuberculosis and its Prevention," by Dr. Charles E. Winslow, Los Angeles, Cal.; "Prevention of Tuberculosis by Feeding," by Dr. E. Cutter, New York, N. Y.; "Importance to a Municipality of a Contagious Disease Hospital," by Dr. J. T. Leal, Paterson, N. J.

The Secretary then read a paper by Dr. Benjamin Lee of Philadelphia, on the subject of "The Necessity for Increased Hospital Accommodations for the Treatment of Contagious Diseases in Large Cities." The Section then adjourned until 3 o'clock P.M.

Afternoon Session. Second day continued. The first business was the report of the Nominating Committee of officers of the Section for the ensuing year: Chairman, Charles H. Shepard, Brooklyn, N. Y.; Secretary, Albert L. Gihon, U.S.N., Washington, D. C.

Executive Committee: one year, Charles A. Lindsley, New Haven, Conn.; two years, George W. Stoner, Baltimore, Md.; three years, Liston H. Montgomery, Chicago, Ill. Upon motion, duly seconded, the report of the committee was unanimously adopted.

Reading and discussion of papers was then proceeded with. "The Bath in Modern Medicine," was the first topic considered, which paper was read by Dr. Charles H. Shepard and upon motion was referred for publication.

"A Practical Demonstration of the Natural Facilities for Water Contamination," by Dr. R. Harvey Reed, Columbus, Ohio, was read by title.

"Why Baltimore is a Healthy City," was read by Dr. D. W. Cathell. Discussed by Dr. James A. Stewart, ex-Commissioner of Health of Baltimore, and Secretary of the Maryland State Board of Health, Dr. Jerome Cochran, the chairman, and the author. This paper was referred for publication.

The next paper read was entitled, "The Use of Vaccine Serum in Variola," by Dr. Llewellyn Eliot, and was discussed by George M. Kober, Jos. J. Kinyoun and the writer. Upon motion, duly seconded, the paper was referred for publication in the JOURNAL.

The next paper announced on the program was read by title, namely, "Importance of State Government Control of Artificial Agencies that may be Productive of Noises," by Augustus P. Clarke, Cambridge, Mass.

"Reform in Medical Expert Testimony," was the title of an essay contributed by Dr. S. S. Herrick, of San Francisco, Cal., which was read by the Chairman, and upon motion, the same was referred for publication.

This was followed by Dr. Elmer Lee, who read a paper entitled "Prevention of Cholera," which was upon motion referred.

The succeeding paper, "The Gold in Garbage," by Dr. Douglas H. Stewart, of New York, N. Y., was, upon motion, passed, as neither the author nor the paper had been seen.

The same course was pursued regarding the paper that was next announced on the program "with no title," by Dr. Cressy A. Wilbur, of Lansing, Mich.

The subjoined list of papers were read by title and referred for publication, as the papers were on hand and the authors had been present during previous sessions:

"The Proprietary System," by Dr. F. E. Stewart, Detroit, Mich.

"How to make Practical Life Insurance Examinations," by Dr. John L. Davis, Cincinnati, Ohio.

"Observations on Hydrophobia and the Pasteur Treatment," by Dr. Antonio Lagorio, Chicago, Ill.

Dr. Granville P. Conn read a paper on "State Medicine v. Fads."

The Section then adjourned until 3 o'clock Thursday afternoon.

THIRD DAY—THURSDAY, MAY 9.

The Section convened at 3 o'clock. Increased interest was manifest as it was known that a series of essays and papers were to be read by members of the American Medical Temperance Association, constituting what the chairman termed a Symposium on Alcohol.

This is the first time that the members of the A. M. T. A. as a body, had ever been invited to participate with any of the sections of the Association proper.

At 3:05 o'clock. Dr. N. S. Davis, President of the A. M. T. A. read an address, "Does Alcohol ever Act as Food, or as a Generator of any Natural Force in the Living Body?"

The discussion that ensued was participated in by Drs. N. Quimby and J. H. Kellogg. The address was, upon motion and seconded, referred for publication, as were all the other papers of the series that were read.

At 3:35 o'clock, Dr. Henry D. Didama read a paper with nearly the same title.

Dr. J. H. Kellogg read a paper on "The Influence of Alcohol upon Urinary Toxicity," discussed by Drs. I. N. Quimby and Elmer Lee.

Dr. I. N. Quimby's paper on the "Fatality of Surgical Operations," was announced, but Dr. Quimby was obliged to retire to keep an appointment elsewhere. The paper was read by title and referred for publication.

Drs. David Paulson and Howard F. Rand, of Battle Creek, Mich., were announced to read "A Report of a Series of Physiologic Tests, Showing the Effects of Alcohol in Moderate Doses upon the Nervous System." As neither author was present the report was passed.

Dr. W. H. Riley's paper "On the Treatment of Typhoid Fever without Alcohol," was read by title, as were also the succeeding papers, entitled "Six Cases of Typhoid Fever Successfully Treated without Alcohol," by Dr. Kate Lindsay, of Battle Creek, and "Alcohol in La Grippe," by Dr. Charles H. Shepard.

The paper announced to be read by Dr. George W. Burleigh, of California, having for its title "Influence of Alcohol on the Blood," was, upon motion, passed, as neither the author nor his paper were present.

Dr. F. W. Grosvenor, of Buffalo, N.Y., read a paper upon "Some of the Factors in the Solution of the Alcoholic Problem."

The succeeding three papers were read by title, namely:

"Alcoholic Intolerance and Predispositions," by Dr. T. D. Crothers, Hartford, Conn.

"Alcoholic Anesthesia, by Dr. L. D. Mason, Brooklyn, N. Y.

"Acute Alcoholic Insanity, as Distinguished from Delirium Tremens," by Dr. John Morris, Baltimore, Md.

An instructive and interesting discussion ensued which was participated in by Drs. N. S. Davis, C. G. Comegys, A. P. Clarke and J. H. Kellogg.

The chairman, Dr. Montgomery, in conclusion, renewed his thanks to the members of the Section for what they have done toward contributing the unprecedented number of valuable essays and papers that have been presented at this meeting, and for personal courtesies extended to himself.

Dr. Jerome Cochran and G. P. Conn were appointed a committee to conduct Chairman-Elect Dr. Charles H. Shepard to the chair, who briefly responded for the new honor that had been conferred upon him, and inquired if there was any miscellaneous or unfinished business to be transacted. Dr. Montgomery announced that he had been informed by the Chairman of the Nominating Committee, that Dr. Gihon could not serve as Secretary of the Section, and as Dr. Gihon had informed the speaker personally of such fact, he moved that Dr. Elmer Lee, of Chicago, be elected Secretary of the Section for the coming year. Carried.

The Chairman then declared the Section adjourned *sine die*.

Since adjournment, Dr. Charles E. Winslow's paper, "Tuberculosis and its Prevention," has come into possession of the JOURNAL, and will appear in due time in the published Transactions.

NECROLOGY.

CHARLES F. J. LEHLBACH, M.D., of Newark, N. J., died August 14. He was 60 years old; was born in Baden-Baden, Germany, and came to America when 14 years old, settling in Newark. He received a classical education from his father, the Rev. Frederick Augustus Lehlbach, who had gained eminence in Germany by his writings. He was graduated from the College of Physicians and Surgeons, New York. In 1861 he enlisted as a private in the District of Columbia Volunteers, and afterward joined Battery B,

Pennsylvania Light Infantry. In 1863 he became assistant surgeon, serving till the close of the war, when he resumed practice in Newark. In 1867 he was made county physician. He leaves a wife and several adult children. One son is health officer of Newark.

James W. Martin, M.D., of Lebanon, Ind., August 26.——Alfred G. Lebault, M.D., of Norfolk, Va., August 27, aged 84 years.——W. W. Cable, M.D., of Pittsburg, Pa., August 25, aged years.——S. B. Finch, M.D., of Washington, D. C., August 26.——H. S. Costikyan, M.D., of Chicago, August 31, aged 53.——Fayette Montrose Weller, of Chicago, September 2, aged 40 years.——J. S. Clark, M.D., of Chicago, August 31, aged 74 years.——Asa Morgan, M.D., of Cedar Bayou, Tex., August , aged 67 years.——Frank Drake Stannard, M.D., of Chicago, September 1, aged 33 years.——O. W. Searing, M.D., of East Oakland, Cal., August 22, aged 65 years——S. K. Towle, M.D., of Haverhill, Mass., August 16, aged 66 years.——N. P. Howard Sr., M.D., of Greenfield, Ind., August 25, aged 73.——R. L. Vaughn, M.D., of Chattanooga, Tenn., August 28.——R. P. Eckert, M.D., of Chicago, August 28.——Wiley Gordon, M.D., of Jacksonville, Ill., August 22.——D. P. Nuzeum, M.D., of Elwood, Ind., August 23.——Frank Honnecker, M.D., of St. Louis, Mo., August 23, aged 25 years.

MISCELLANY.

Ten Thousand Unfit Dwellings.—It is stated that in Birmingham, England, there are not less than ten thousand houses that are unfit for human habitation, and yet are allowed to be occupied and even overcrowded.

Important Charitable Bequests.—The will of the late Sarah Gay, of Newburg, N. Y., gives, under certain conditions, the sum of $10,000 to the St. Luke's Hospital of New York city, and a like amount to the Home for the Friendless.

Ovaries, Tubes and Uterus in a Hernial Sac.—In operating for the relief of a right inguinal hernia in a female infant, Mr. Leopold Hudson, surgeon to the Middlesex Hospital, London, found both ovaries, both Fallopian tubes and the uterus in the sac. The tubes were much congested from constriction at the neck; a director was passed in, the constriction divided, and the organs were replaced—the left ovary and tube being first returned, then the uterus, and lastly the right appendages. Many abnormal contents of hernial sacs have been recorded—a bladder, an ovary, etc., and once an ovary in a femoral hernia with the Fallopian tube constricted at the neck; but Mr. Hudson's case is probably unique.

More Bacteriology and Sanitation Should be Taught at West Point.—The *Independent* predicts that bacteriology must in the near future, be given a place in the curriculum of our national schools of warfare. It is stated that the superintendent at West Point has subjected himself to severe animadversion from opposing the introduction of a short course of instruction in hygiene and first aid to the injured. The reason for his opposition seems to be that no time for such a course can be spared from the courses of study already marked out and followed. The Board of Visitors for 1894 had, among others, the celebrated anatomist and surgeon, Dr. W. W. Keen, who was surprised to find that the entire instruction in hygiene and physiology consisted in six advance and five review lessons, with an occasional incidental allusion to such subjects as ventilation, choice of site for camps. The visitors thought that a little of the time now given to mineralogy and geology might be profitably devoted to a study of the structure and physiologic needs of the human frame; and certainly the military leader of the future will need to know much that belongs to bacteriology and sanitation, or he will fall out of step with his age.

Important Section of Kansas Crimes Act Invalid.—Section 15 of the Kansas Crimes Act, which provides that "every person who shall administer to any woman, pregnant with a quick child, any medicine, drug or substance whatsoever, or shall use or employ any instrument or other means, with intent thereby to destroy such child, unless the same shall have been necessary to preserve the life of such mother, or shall have been advised by a physician to be necessary for that purpose, shall be guilty of manslaughter in the second degree," the Supreme Court of that State holds (State v. Young, decided June 8, 1895,) is inoperative and invalid, as it undertakes to establish a degree of felonious homicide where neither the death of the child nor the mother results from the acts committed, and where there may be no killing or homicide.

A New Title.—The Kansas City *World*, of August 27, contains the following amusing slip of the compositor:

"NEW MEDICAL SCHOOL.

"Proposes to put finishing touches upon medical educations. The Kansas City Pyrotechnic Post-Graduate Medical School to-day filed articles of incorporation in the office of the county recorder. The incorporators are: Homer C. Crowell, five shares; George M. Gray, five shares; Jacob Block, five shares; George W. Grove, five shares; George Halley, one share, and Homer C. Crowell, as trustee, seventy-nine shares. The board of directors comprises Homer C. Crowell, Jacob Block and George Halley. The capital stock is $2,000."

"Pyrotechnic" would be an appropriate designation for some schools, but probably not for this one.

A Hospital Broken Up by a Chinese Mob.—On August 6, the Mission Hospital at Fat-Shan was destroyed by Chinese rioters. The hospital, with other destroyed property, was owned by the English Wesleyan Church. The city where it was located is a large manufacturing center, fifteen miles west of the city of Canton. It has a population of 500,000, and is frequently spoken of as the "Birmingham" of China. Missionary work in its various forms has been carried on there for about thirty-five years. The London Mission has a flourishing work there, which is sustained by the Chinese church in Hongkong. The English Wesleyan Mission has chapels, school, hospital and residence for several missionary families there, a very prosperous mission. Their hospital, which has developed under the efficient management of Dr. Wenyon and his colleague, Dr. Macdonald, is one of the notable institutions in South China. Not only has the medical and surgical work done been of a very high character, but the hospital has, by judicious management, become practically self-supporting. It has been patronized by many of the wealthier people. Their pecuniary acknowledgments of benefits received, and the fees received by the physicians in charge for service rendered in answer to special calls, have sufficed to cover the current expenses of the hospital. It has demonstrated the fact that even Chinamen can appreciate superior talent and not only respect it, but desire it the more when they have to pay for it. The high standing of this hospital among the respectable residents of Fat-Shan has not saved it from the mob.

Another Prevaricator.—One Dr. R. B. Miller, who claims his residence at 170 Oakwood Boulevard, Chicago, and his reference, the Globe Savings Bank, Chicago, has published a four-page blanket sheet in which, with much bad spelling and bombast, he sets forth his utter contempt for the old hide-bound fogies who stick to the Code and prefer to grope in the dark rather than encourage such bright and shining lights as Miller, who to use his own language, "is pushing to the front, determined to conquer disease by any and all remedies known, or that they may discover." Miller's sheet says that "we are proud of our past achievements, having treated and cured thousands of cases in Illinois during the past five years, many of whom had been given up as hopeless and left to their fate to die in despair."

According to the register of the Illinois State Board of Health, Russell B. Miller registered as a physician and his license was issued Oct. 16, 1891. He has not yet completed

his five years, but at the rate he is "pushing to the front" he may complete the remainder of it in a summary fashion. This person announces himself as the "President of the AMERICAN MEDICAL ASSOCIATION of Chicago," which announcement evidently meant to catch the unwary, is one of the basest subterfuges. The State Board of Health should revoke the man's license without delay.

Wisconsin Has Provided a Cholera Contingent Fund.—The Wisconsin Legislature, at its last session, appropriated to the State Board of Health a sum not exceeding $50,000 for the two years ending Feb. 1, 1897, which shall be a fund, which, by and with the advice and consent of the Governor, may be drawn upon by said board, and used by it in such manner as may seem to it necessary to prevent the introduction or spread of Asiatic cholera or other dangerous contagious disease in the State. Any member of the State Board of Health, except the Secretary, who is engaged in work for the prevention of cholera outside of the city in which such member resides, shall be allowed and paid for the time in which he is actually so engaged, such sum as the Governor may approve, not exceeding $15 per day in addition to traveling and other necessary expenses.

Louisville Notes.

HEALTH OFFICER'S REPORT.—During the month there were 265 deaths, of which 143 were male, 200 white, 79 married and 138 natives of Louisville. The total is 42 less than August of last year. Consumption heads the list with 28; typhoid fever and organic heart disease, each 13; inanition, 14; meningitis, cerebral, 12. Eight of those dying were over 100 years of age. The annual death rate per 1,000, 15; white (164,261), 14; colored (35,739), 23.

G. A. R.—There was a well attended meeting held in the City Hall, of those doctors who are to serve in the coming Encampment. Dr. Geo. W. Griffiths, Vice-President of the Executive Committee, addressed those present, emphasizing the necessity of prompt organization.

BLOOM.—Dr. I. N. Bloom has been elected to the Chair of Genito-Urinary and Skin Diseases in the University of Louisville, Medical Department. Dr. John L. Howard will direct the workings of the bacteriologic laboratory in the same school.

Washington Notes.

HEALTH OF THE DISTRICT.—The report of the Health Officer for the week ended August 24, is as follows: death rate per 1,000 per annum, white, 20.40; colored, 28.69; total, 23.06. There was an improvement in the health of the city last week. According to the reports received at the Health Department, the deaths fell off 11 per cent. as compared with the last report. The death rate accordingly fell from 25.95 to 23.06. The improvement was mainly owing to the decrease in mortality among children under 5 years old. There was a notable absence of deaths from the dangerous contagious maladies, with the exception of those from diphtheria, from which there were three deaths while no new cases were reported.

SECRETARY MORTON'S HYGIENIC ORDER.—An important order, giving full protection to foreign consumers of American meat products, was issued last week by Secretary Morton. It will prevent the exportation of any beef that is not inspected, and will cause the exporters of horse meat so to mark the packages that the nature of the contents shall be apparent. The action is authorized by an act of March 3, 1891, amended March 2, last. The order follows:

"It is ordered that from and after Sept. 16, 1895, all beef offered for exportation, whether fresh, salted, canned, corned or packed, shall be accompanied by a certificate showing that the cattle from which it was produced were found free from disease, and the meat sound and wholesome, by an inspector of this department. And in order that it may be determined whether all beef exported has been so inspected and found to be sound and wholesome, it is further ordered that the meat of all other species of animals, which for any reason does not bear the inspection tags and stamps of this department, shall be packed in barrels, cases or other packages which are legibly marked in such manner as to clearly indicate the species of animal from which the meat was produced. Meat which is not so marked, and which is not accompanied by a certificate of inspection will be classed as uninspected beef and will not be allowed exportation.

"Notice is hereby given to exporters of meat, whether said meat is fresh, salted, corned, packed or otherwise prepared, and to owners and agents of vessels upon which said meat is exported, that no clearance can be given to any vessel having on board said meat until the provisions of this order are complied with. J. STERLING MORTON, Secretary."

PHYSICIANS APPOINTED TO OFFICE.—The Commissioners have made an appointment to fill the vacancy caused by Dr. Austin O'Malley, medical sanitary inspector of the Health Department, whose resignation was formally accepted. Dr. John E. Walsh is appointed sanitary inspector, with a salary of $1,200 per annum and an indefinite leave of absence without pay, pending his return to Washington. Dr. Walsh is at present in the Arctic regions with the Peary relief expedition. Dr. R. D. Boss has been appointed acting medical inspector, to serve until Dr. Walsh is ready to take charge of his new office. Dr. Edward M. Parker was appointed bacteriologist at a salary of $400 per annum, vice O'Malley, appointment to take effect September 1. Dr. G. C. Clark has been appointed physician to the poor at $30 per month, to fill the vacancy caused by the promotion of Dr. Boss. The appointment of Dr. Parker is a particularly fitting one. He is the assistant pathologist, and is in charge of the Bacteriologic Laboratory in the Central Dispensary and Emergency Hospital here, and has been assistant to Dr. Welch at the Johns Hopkins Hospital. The District Health Office is to be congratulated upon securing the services of Dr. Parker; the salary is, however, entirely too small to begin to compensate the Doctor for his valuable services.

GARBAGE LAW TO BE ENFORCED.—About fifty cases of violations of the garbage law by citizens were tried in the police court during the past week. The Health Department is not demanding the payment of fines, but simply requires compliance with the laws on the subject.

THE PUBLIC SERVICES.

Army Changes. Official list of changes in the stations and duties of officers serving in the Medical Department, U. S. Army, from August 24, 1895, to August 30, 1895.

1st Lieut. William W. Quinton, Assistant Surgeon, is relieved from duty at Fort Riley, Kansas, and ordered to Fort Logan, Colorado, for temporary duty at Fort Logan, Colorado, relieving Captain Louis A. La Garde, Asst. Surgeon. Captain La Garde, on being thus relieved, will proceed to Boston, Mass., and report for duty as Attending Surgeon and Examiner of Recruits.

Leave of absence, to date from August 21, and to include September 30, 1895, is granted Lieut.-Col. John S. Billings, Deputy Surgeon General, U.S. Army.

Navy Changes. Changes in the Medical Corps of the U. S. Navy for the week ending August 31, 1895.

August 29. Surgeon J. E. Gardner, and P. A. Surgeon F. J. B. Cordeiro, to temporary duty as members of the medical board at the Naval Academy, September 5.

LETTERS RECEIVED.

Ahrend, D. H., Chicago, Ill.; Ammonol Chemical Co., New York, N. Y.
Bacon, Chas. S., Vienna, Austria; Berna, H. & Co., St. Louis, Mo.; Buckley, Jno. J., Missoula, Mont.; Brains Publishing Co., New York, N. Y.
Cooper, O. O., Hinton, W. Va.; Columbia Chemical Co., Washington, D. C.; Cone, Andrew, New York, N. Y.
Forbes, S. F., Toledo, Ohio.
Gaston, J. McFadden, Atlanta, Ga.; Gilson, G. E., Shipman, Ill.; Gibbs, F. M., Scranton, Pa.; Grigsby, W. E., Blandinsville, Ill.; Glycero-Acid Phosphate Co., New York, N. Y.
Henry Pharmacal Co., Louisville, Ky.; Hanks, H. T., New York, N. Y.; Hurley, J. M., San Bernardino, Cal.; Hummel, A. L. (3), New York, N. Y.
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